Cowlitz County Fire District #6
CALL FOR BIDS – TRIPLE COMBINATION PUMPER
Bids due by 5:00 PM (Pacific Standard Time) on July 25, 2003

Notice is hereby given that sealed bids will be received by Cowlitz County Fire District #6 until 5:00 PM (Pacific Standard Time) on July 25, 2003 for furnishing one new triple combination pumper meeting all current requirements applicable.

Bids shall be addressed to "Cowlitz County Fire District #6, P.O. Box 205, Castle Rock, Washington 98611". Bids shall be securely sealed and endorsed upon the outside wrapper with the words "TRIPLE COMBINATION PUMPER SEALED BID".

Each bid package must be accompanied by a certified check for 5% of the amount of the bid, and made payable to Cowlitz County Fire District #6. All checks will be returned upon execution of the contract. Should the successful bidder fail to enter into a contract and furnish a satisfactory performance bond as indicated in the specifications within 10 days from the date he is notified, the certified check shall be forfeited as liquidated damages.

The bids shall be publicly opened on August 11, 2003 at 8:30 PM (Pacific Standard Time) at the Castle Rock Fire Station. No bidder may withdraw their bid after the hour set for the opening of bids or before award of contract unless said award is delayed for a period exceeding thirty (30) calendar days.

Beginning June 23, 2003 copies of specifications may be obtained electronically via the Internet at www.crfa.gov in PDF format. Copies of specifications may also be obtained in paper format by sending a written request along with a nonrefundable deposit of $20.00 to Cowlitz County Fire District #6, P.O. Box 205, Castle Rock, WA 98611. For additional information contact Chief Eric Koreis, (360) 274-4413.

Cowlitz County Fire District #6 reserves the right to reject any or all bids or accept any presented which is deemed to be in it's best interest and is not necessarily bound to accept low bid.

Bidder Complies	
Yes	No

SPECIFICATIONS FOR A TRIPLE COMBINATION PUMPER

INTENT OF SPECIFICATIONS

It shall be the intent of these specifications to cover the furnishing and delivery of a complete apparatus equipped as hereinafter specified. These specifications cover only the general requirements as to the type of construction and test to which the apparatus shall conform, together with certain details as to finish, equipment and appliances with which the successful bidder shall conform. Minor details of construction and materials, which are not otherwise specified, are left to the discretion of the contractor, who shall be solely responsible for the design and construction of all features. Apparatus proposed by the bidder shall meet the applicable requirements of the National Fire Protection Association (NFPA) as stated in current edition at time of contract execution. Loose equipment shall be provided only as stated in the following pages.

Bids shall only be considered from companies that have an established reputation in the field of fire apparatus construction and have been in business for a minimum of 20 years. Further, bidder shall maintain dedicated service facilities for the repair and service of products. Evidence of such a facility shall be included in bidder proposal.

Each bidder shall furnish satisfactory evidence of their ability to construct the apparatus specified and shall state the location of the factory where the apparatus is to be built. The bidder shall also show that the company is in position to render prompt service and to furnish replacement parts for said apparatus.

Each bid shall be accompanied by a set of "Contractor's Specifications" consisting of a detailed description of the apparatus and equipment proposed and to which the apparatus furnished under contract shall conform. These specifications shall indicate size, type, model and make of all component parts and equipment.

QUALITY AND WORKMANSHIP

The design of the apparatus shall embody the latest approved automotive engineering practices. The workmanship shall be of the highest quality in its respective field. Special consideration shall be given to the following points: Accessibility of the various units which require periodic maintenance, ease of operation (including both pumping and driving) and symmetrical proportions. Construction shall be rugged and ample safety factors shall be provided to carry the loads specified and to meet both on and off road requirements and speed conditions as set forth under "Performance Tests and Requirements". Welding shall not be employed in the assembly of the apparatus in a manner that shall prevent the ready removal of any component part for service or repair. All steel welding shall follow American Welding Society D1.1-96 recommendations for structural steel welding. All aluminum welding shall be done to American Welding Society and ANSI D1.2-96 requirements for structural welding of aluminum. Flux core arc welding shall use alloy rods, type 7000, American Welding Society standards A5.20-E70T1. The manufacturer is required to have an American Welding Society certified welding inspector in plant during working hours to monitor weld quality.

DELIVERY

Apparatus, to insure proper break in of all components while still under warranty, **shall be delivered under its own powe**r - rail or truck freight shall not be acceptable. A qualified delivery engineer representing the contractor shall deliver the apparatus and remain for a sufficient length of time to instruct personnel in the proper operation, care and maintenance of the equipment delivered.

INFORMATION REQUIRED

The manufacturer shall supply at time of delivery, complete operation and maintenance manuals covering the completed apparatus as delivered. A permanent plate shall be mounted in the driver's compartment which specifies the quantity and type of fluids required including engine oil, engine coolant, transmission, pump transmission lubrication, pump primer and drive axle.

PERFORMANCE TESTS AND REQUIREMENTS

A road test shall be conducted with the apparatus fully loaded and a continuous run of ten (10) miles or more shall be made under all driving conditions, during which time the apparatus shall show no loss of power or overheating. The transmission drive shaft or shafts, and rear axles shall run quietly and be free from abnormal vibration or noise throughout the operating range of the apparatus. Vehicle shall adhere to the following parameters:

A) The apparatus, when fully equipped and loaded, shall have not less than 25% nor more than 50% of the weight on the front axle, and not less than 50% nor more than 75% on the rear axle.

B) The apparatus shall be capable of accelerating to 35 mph from a standing start within 25 seconds on a level concrete highway without exceeding the maximum governed rpm of the engine.

C) The service brakes shall be capable of stopping a fully loaded vehicle in 35 feet at 20 mph on a level concrete highway. The air brake system shall conform to Federal Motor Vehicle Safety Standards (FMVSS) 121.

D) The apparatus, fully loaded, shall be capable of obtaining a speed of 50 mph on a level concrete highway with the engine not exceeding its governed rpm (full load).

FAILURE TO MEET TEST

In the event the apparatus fails to meet the test requirements of these specifications on the first trial, second trials may be made at the option of the bidder within 30 days of the date of the first trial. Such trials shall be final and conclusive and failure to comply with these requirements shall be cause for rejection. Failure to comply with changes to conform to any clause of the specifications, within 30 days after notice is given to the bidder of such changes, shall also be cause for rejection of the apparatus. Permission to keep or store the apparatus in

any building owned or occupied by the purchaser or its use by the purchaser during the above-specified period with the permission of the bidder shall not constitute acceptance.

LIABILITY

The successful bidder shall defend any and all suits and assume all liability for the use of any patented process including any device or article forming a part of the apparatus or any appliance furnished under the contract.

SPECIFICATION BID REQUIREMENTS

Bidders shall also indicate in the "yes/no" column if their bid complies **on each item** (PARAGRAPH) specified. Exceptions shall be allowed if they are equal to or superior to that specified and provided they are listed and fully explained on a separate page.

Proposals taking total exception to specifications shall not be acceptable.

Also, bidders shall submit a detailed proposal. A letter only, even though written on a company letterhead, shall not be sufficient. Bid proposals shall be submitted in the same sequence as specifications for ease of evaluation, comparison and checking of compliance. **An exception to these requirements shall not be tolerated.**

EXCEPTIONS

All exceptions shall be stated no matter how seemingly minor. Any exceptions not taken shall be assumed by the purchaser to be included in the proposal, regardless of the cost to the bidder.

GENERAL CONSTRUCTION

The apparatus shall be designed with due consideration to distribution of load between the front and rear axles. Weight balance and distribution shall be in accordance with the recommendations of the National Fire Protection Association.

COMMERCIAL GENERAL LIABILITY INSURANCE

The successful bidder shall, during the performance of the contract and for three (3) years following acceptance of the product, keep in force at least the following minimum limits of commercial general liability insurance:

Products/Completed Operations Aggregate	$2,000,000
Personal and Advertising Injury	$1,000,000
Each Occurrence	$1,000,000

Coverage shall be written on a Commercial General Liability form. The policy shall be written on an occurrence form and shall include Contractual Liability coverage. The policy shall include owner as an additional insured as their interest may appear.

The required limits can be provided by one or more policies provided all other insurance

requirements are met.

Coverage shall be provided by a carrier(s) rated "Excellent" by A.M. Bests.

UMBRELLA/EXCESS LIABILITY INSURANCE

The successful bidder shall, during the performance of the contract and for three (3) years following acceptance of the product, keep in force at least the following minimum limits of umbrella liability insurance:

Aggregate: $25,000,000
Each Occurrence: $25,000,000

The policy shall be written on an occurrence basis and at a minimum provide the same coverage's as Bidder's General Liability, Automobile Liability and Employer's Liability policies. Owner shall be included as an additional insured on the General Liability and Automobile Liability policies as their interest may appear. The required limits can be provided by one or more policies provided all other insurance requirements are met.

Bidder agrees to furnish owner with a current Certificate of Insurance with the coverage's listed above along with its bid. The certificate shall be made out to the purchaser and be an original, no photocopies shall be accepted. The Certificate of Insurance shall provide that owner be given 30 days advance notice of cancellation, nonrenewal or material change in coverage.

ISO COMPLIANCE

The manufacturer shall operate a Quality Management System under the requirements of ISO 9001. These standards sponsored by the "International Organization for Standardization (ISO)" specify the quality systems that shall be established by the manufacturer for design, manufacture, installation and service. A copy of the certificate of compliance shall be included with the bid.

SINGLE SOURCE MANUFACTURER

Bids shall only be accepted from a single source apparatus manufacturer. The definition of single source is a manufacturer that designs and manufactures their products using an integrated approach, including the chassis, cab and body being fabricated and assembled on the bidder's premises. The warranties relative to the chassis and body design (excluding component warranties such as engine, transmission, axles, pump, etc.) must be from a single source manufacturer and not split between manufacturers (i.e. body and chassis). The bidder shall provide evidence that they comply with this requirement.

INSPECTION TRIP(S)

The bidder shall provide two (2) factory inspection trip(s) for four (4) customer representative(s). The inspection trip(s) shall be scheduled at times mutually agreed upon between the manufacturer's representative and the customer. All costs such as travel, lodging

and meals shall be the responsibility of the bidder.

APPROVAL DRAWING

A drawing of the proposed apparatus shall be provided for approval before construction begins. The sales representative shall also have a copy of the same drawing. The finalized and approved drawing shall become part of the contract documents. This drawing shall indicate the chassis make and model, location of the lights, siren, horns, compartments, major components, etc.

A "revised" approval drawing of the apparatus shall be prepared and submitted by the manufacturer to the purchaser showing any changes made to the approval drawing.

DRAWING, PUMP OPERATOR'S PANEL

A detailed drawing to scale of the pump operator's panel shall be provided for approval prior to construction. This drawing shall include all of the gauges and controls located on the pump operator's panel.

WARRANTY

Each piece of new fire or rescue apparatus shall be warranted to be free from defects in materials or workmanship under normal use and service. Each manufacturer shall supply, as a part of their bid package, a copy of the warranty or warranties that they propose to provide, and in no case shall it be less than one (1) year on the entire apparatus.

All other warranties, as outlined in these specifications shall be provided in writing as a part of the bid package.

Failure to provide the warranties as outlined throughout these specifications shall be cause for rejection of the bid package.

BID BOND

All bidders shall provide a bid bond as security for the bid in the form of a 10% bid bond, to accompany their bid. This bid bond shall be issued by a Surety Company who is listed on the U.S. Treasury Departments list of acceptable sureties as published in Department Circular 570. The bid bond shall be issued by an authorized representative of the Surety Company and shall be accompanied by a certified power of attorney dated on or before the date of bid. The bid bond shall include language which assures that the bidder/principal shall give a bond or bonds, as may be specified in the bidding or contract documents, with good and sufficient surety for the faithful performance of the contract, including the warranty, and for the prompt payment of labor and material furnished in the prosecution of the contract.

The bidder's bonded warranty shall extend to the chassis and body, regardless of the manufacturer.

Proposals received from bidders who do not manufacture the chassis shall provide a warranty

which shall be issued jointly and severally by, and signed by, both the bidder and the chassis manufacturer.

If the successful bidder does not manufacture the chassis, the bidder shall supply a separate warranty bond, in addition to their performance bond, along with their signed contract. This warranty bond shall guarantee all terms and conditions of the warranty and names both the bidder and chassis manufacturer as co-principals. This warranty bond shall be issued for the contract amount and shall remain in force for a term which is consistent with the term of the warranty quoted in the bid.

PERFORMANCE BOND

The successful bidder shall provide, within thirty (30) days after award of contract, and along with a signed copy of the contract, a performance bond, which guarantees performance of all terms and conditions of the contract and warranty agreement. The performance bond will specifically cover the performance of the contract according to its terms and conditions, as well as payment of all related bills and encumbrances. This performance bond shall be issued by a surety company who is listed by the U.S. Treasury Department's list of approved sureties, as published in Circular 570, as of the bid date. The performance bond shall be issued in an amount equal to 100% of the contract amount and shall be dated concurrent to, or subsequent to, the date of the contract.

CHASSIS

Chassis provided shall be a new, tilt-type custom fire apparatus. The chassis shall be manufactured in the apparatus body builder's facility eliminating any split responsibility. The chassis shall be designed and manufactured for heavy-duty service, with adequate strength, capacity for the intended load to be sustained, and the type of service required. The chassis shall be the manufacturer’s first line tilt cab.

SEATING CAPACITY

The seating capacity in the cab shall be eight (8).

WHEELBASE

The wheelbase of the vehicle shall be no greater than 233 inches.

GVW RATING

The gross vehicle weight rating shall be a minimum of 47,800#.

FRAME

The chassis frame shall be built with two (2) steel channels bolted to five (5) cross members or more, depending on other options of the apparatus. The side rails shall have a 13.38" tall web over the front and mid sections of the chassis, with a continuous smooth taper to a 10.75" over the rear axle. Each rail shall have a section modulus of 25.992 in. sq., and a resisting bending moment (rbm) of 2,859,122 inch pounds over the critical regions of the frame assembly, with a section modulus of 18.96 in. sq. with an rbm of 2,085,803 inch pounds over

the rear axle. The frame rails shall be constructed of 110,000 psi yield strength heat treated .38" thick steel, with 3.50" wide flanges.

FRAME RAIL WARRANTY

The frame rails shall be guaranteed for the **life of the vehicle,** which is the estimated to be 50 years, against defects in design, material or workmanship, excluding accident or abuse. A copy of the fire apparatus manufacturer's warranty shall be included with the bid.

In addition, a full length main frame inverted "L" liner shall be provided. It also shall be heat treated steel measuring 12.00" x 3.00" x .25". Each liner shall have a section modulus of 7.795 cu. in., yield strength of 110,000 psi and rbm of 857,462 inch pounds. Total rbm at wheelbase center shall be 3,750,421 pounds per rail.

FRONT NON DRIVE AXLE

The front axle shall be of the independent suspension design with a ground rating of 22,800 pounds.

Upper and lower control arms shall be used on each side of the axle. Upper control arm castings shall be made of 100,000-psi yield strength 8630 steel and the lower control arm casting shall be made of 55,000-psi yield ductile iron.

The center cross members and side plates shall be constructed out of 80,000-psi yield strength steel.

Each control arm shall be mounted to the center section using elastomer bushings. These rubber bushings shall rotate on low friction plain bearings and be lubricated for life. Each bushing shall also have a flange end to absorb longitudinal impact loads, reducing noise and vibrations.

There shall be nine (9) grease fittings supplied, one (1) on each control arm pivot and one (1) on the steering gear extension.

The upper control arm shall be shorter than the lower arm so that wheel end geometry provides positive camber when deflected below rated load and negative camber above rated load.

Camber at load shall be zero degrees for optimum tire life.

The kingpin bearing shall be of low friction design and be sealed for life.

Toe links that are adjustable for alignment of the wheel to the center of the chassis shall be provided.

The wheel ends must have little to no bump steer when the chassis encounters a hole or

obstacle.

The steering linkage shall provide proper steering angles for the inside and outside wheel, based on the vehicle wheelbase.

The axle shall have a third party certified turning angle of 45 degrees. Front discharge, front suction, or aluminum wheels shall not infringe on this cramp angle.

WARRANTY, FRONT NON DRIVE AXLE
The non drive axle system shall have a **three (3) year** parts and labor warranty.

OIL SEALS
Oil seals shall be provided on the front axle.

SHOCK ABSORBERS
Heavy-duty telescoping shock absorbers (Gabrial) shall be provided on the front suspension.

REAR AXLE
The rear axle shall be a Meritor™, Model RS-26-185, with a capacity of 27,000 pounds.

REAR AXLE WARRANTY
The Meritor™ **three (3) year** parts and labor warranty shall be provided with this axle, plus an additional **two (2) years** of parts only coverage. Meritor™ shall also provide a **one (1) year** parts and labor warranty for wheel seals. The seal warranty shall apply to our standard Meritor™ wheel seals and shall not apply to another specified seal. If other seals are specified, the warranty shall be parts only.

TOP SPEED OF VEHICLE
A rear axle ratio shall be furnished to allow the vehicle to reach an approximate top speed of 67 to 70 MPH.

OIL SEALS
Oil seals shall be provided on the rear axle.

DRIVER CONTROL DIFFERENTIAL LOCK (DCDL)
A rear axle shall be equipped with a driver controlled differential lock (DCDL).

The control shall be located within easy reach of the driver. An indicator light shall be provided next to the control switch.

SUSPENSION
Front independent suspension shall be provided with a minimum ground rating of 22,800 pounds.

The independent suspension system shall be designed to provide maximum ride comfort. The design shall allow the vehicle to travel at highway speeds over improved road surfaces and at moderate speeds over rough terrain with minimal transfer of road shock and vibration to the vehicle's crew compartment.

Each wheel shall have torsion bar type spring. In addition, each front wheel end shall also have energy absorbing jounce bumpers to prevent bottoming of the suspension.

The suspension design shall be such that there are at least 10.00" of total wheel travel and a minimum of 3.75" before suspension bottoms.

The torsion bar anchor lock system allows for simple lean adjustments, without the use of shims. One can adjust for a lean within 15 minutes per side. Anchor adjustment design is such that it allows for ride height adjustment on each side.

The independent suspension shall be put through a durability test that has simulated a minimum of 140,000 miles of inner city driving.

SUSPENSION, REAR

Rear springs to be semi-elliptical, 3.00" x 52.00", 12 leaf main with a ground of 27,000 pounds. Spring hangers to be castings with provisions for lubrication. The grease fittings to be 90 degree type and shall be accessible without removing the wheels or cutting any sheet metal. Two top leaves to wrap the forward spring hanger pin and the top leaf to wrap the rear spring hanger pin on both the front and rear suspensions.

Kaiser spring pins shall be provided, with double "figure-eight" grease grooves and a layer of electroless nickel plating, 1.0 mil thick around the entire pin. The bushing that holds the spring pin in place shall also have a grease groove.

ANTI-LOCK BRAKE SYSTEM

The vehicle shall be equipped with a Wabco 4S4M, anti-lock braking system. The ABS shall provide a four (4) channel anti-lock braking control on both the front and rear wheels. It shall be a digitally controlled system that utilizes microprocessor technology to control the anti-lock braking system. Each wheel shall be monitored by the system. When any particular wheel begins to lockup, a signal shall be sent to the control unit. This control unit then shall reduce the braking of that wheel for a fraction of a second and then reapply the brake. This anti-lock brake system shall eliminate the lockup of any wheel thus helping to prevent the apparatus from skidding out of control.

ANTI-LOCK BRAKE SYSTEM WARRANTY

The Wabco ABS system shall come with a **three (3) year or 300,000 mile parts and labor** warranty provided by Meritor Wabco Vehicle Control Systems.

BRAKES

Specifications	Bidder Complies	
	Yes	No

The service brake system shall be full air type.

The front brakes shall be Knorr/Bendix disc type with a 17.00" ventilated rotor for improved stopping distance.

The brake system shall be certified, third party inspect for improved stopping distance.

The rear brakes shall be Meritor™ 16.50" x 7.00" cam operated with automatic slack adjusters.

ENGINE BRAKE

A Jacobs engine brake is to be installed with the controls located on the instrument panel within easy reach of the driver.

The driver shall be able to turn the engine brake system on/off and have a high and low setting.

The engine brake shall be installed in such a manner that when the engine brake is slowing the vehicle the brake lights are activated.

The ABS system shall automatically disengage the auxiliary braking device, when required.

AIR COMPRESSOR, BRAKE SYSTEM

The air compressor shall be a Cummins/Wabco with 18.7 cubic feet per minute output.

BRAKE SYSTEM

The brake system shall include:

- Bendix-Westinghouse dual brake treadle valve with vinyl covered foot surface.

- A heated automatic moisture ejector on air dryer.

- Total air system capacity of 4,362 cubic inch.

- Two (2) air pressure gauges with red warning light and audible alarm, that activates when air pressure falls below 60 psi.

- MGM spring set parking brake system.

- Parking brake operated by a Bendix-Westinghouse PP-1 control valve.

- A parking "brake on" indicator light on instrument panel.

- Bendix-Westinghouse SR-1 valve, in conjunction with a double check valve system, shall be

provided with an automatic spring brake application at 40 psi.

- Wabco System Saver 1200 air dryer.

BRAKE LINES
Color coded nylon brake lines shall be provided. The lines shall be wrapped in a heat protective loom where necessary in the chassis.

AIR INLET WITH AUTOMATIC EJECT
One (1) air inlet with Kussmaul Air Eject shall be provided. It shall allow station air to be supplied to the apparatus brake system through a shoreline hose. The inlet shall automatically disconnect the air line when the truck is started. It shall be equipped with a male coupling and be located on the driver side rear bulkhead of body. A check valve shall be provided to prevent reverse flow of air. The inlet shall discharge into the "wet" tank of the brake system. A mating female coupling shall also be provided with the loose equipment.

AIR TANK FOR TOOLS
An additional air tank with 1454 cubic inch displacement shall be provided for the use of powering air tools. Two (2) air tool outlets with metering valves, one (1) located at the driver's side pump panel and one (1) located at the passenger's side pump panel, shall be provided.

The output flow of the engine air compressor varies with engine RPM. Full compressor output is only achieved at governed engine speed. Engine speed may be limited by generators, pumps and other PTO driven options.

AUTOMATIC MOISTURE EJECTOR(s)
Four (4) automatic moisture ejectors, shall be installed in the brake system.

The moisture ejector (s) shall be provided on the air reservoirs (s).

ENGINE
The chassis shall be powered by a Cummins electronic engine as described below:

- Model: ISL (electronic)

- Number of Cylinders: Six (6)

- Bore and Stroke: 4.49" x 5.69"

- Displacement: 540 cubic inches

- Rated Brake Horsepower: 400 at 2000 rpm

- Torque: 1200 at 1300 rpm

- Compression Ratio: 16.6:1

- Governed rpm: 2200

Standard equipment on the engine shall include the following:

- Air Cleaner: Farr or equal

- Fuel Filters: Dual, with check valve, integrated water separator, and water in fuel sensor

- Coolant Filter: Spin-on with shut off valve (precharged with coolant inhibitor)

- Governor: Limiting speed type

- Injectors: Cam operated, unit type, clean tip

- Lube Oil Cooler

- Lube Oil Filter: Full flow

- Starting Motor: 12-volt

- Turbocharger

- Charge Air Cooled

ENGINE WARRANTY

The engine shall have a **five (5) year or 100,000 mile** warranty provided by the engine manufacturer. The engine manufacturer shall add a $100.00 deductible during the extended basic coverage period in years 3, 4, and 5. There shall be no deductible in the first 2 years of warranty.

ENGINE INSTALLATION CERTIFICATION

The fire apparatus manufacturer shall provide, at the time of delivery, a letter from the engine manufacturer stating they approve of the engine installation in the bidder's chassis. The approval of the engine installation shall be at full horsepower rating in a continuous duty application under all operating conditions, including road and pump. No type of automatic horsepower reduction feature shall be allowed.

There shall be no exception to any portion of the engine installation certification.
Nonconformance shall lead to immediate rejection of bid.

ENGINE AIR INTAKE
The air intake with Ember Separator shall be mounted high on the passenger side of cab, to the front of crew cab door to prevent road dirt and recirculating hot air from entering the engine.

The Ember Separator shall be easily accessible through a hinged stainless steel grille, with one (1) flush quarter turn latch.

EXHAUST SYSTEM
The exhaust system shall be 4.00" diameter.

The exhaust shall exit on the right side ahead of the rear wheels.

A heat deflector shield shall be provided where the tail pipe is routed under any side compartmentation.

Exhaust outlet to be equipped with chrome plated elbow.

FUEL SEPARATOR
The engine shall be equipped with a Racor in-line spin-on fuel and water separator in addition to the engine fuel filters.

ENGINE HEATER
A 1000 watt, 120 volt, immersion type engine heater shall be installed with the AC power inlet located to the rear of the driver's door.

SWITCH, ENGINE HEATER
A manual on/off switch shall be provided in the cab to control the engine heater.

HIGH IDLE
A high idle switch shall be provided, inside the cab, on the instrument panel, that shall automatically maintain a preset engine rpm. A switch shall be installed, at the cab instrument panel, for activation/deactivation.

The high idle shall be operational only when the parking brake is on and the truck transmission is in neutral. A green indicator light shall be provided adjacent to the switch. The light shall illuminate when the above conditions are met. The light shall be labeled "OK To Engage High Idle".

COOLANT LINES
Silicone hoses shall be used for all engine/heater coolant lines installed by the chassis manufacturer.

Hose clamps shall be stainless steel "constant torque type" to prevent coolant leakage. They

shall react to temperature changes in the cooling system and expand or contract accordingly while maintaining a constant clamping pressure on the hose.

RADIATOR

Radiator and the complete cooling system shall meet or exceed NFPA cooling system standards. Cooling system capacity shall exceed all cooling requirements specified by the engine manufacturer under all truck operating conditions. It shall have a built-in low coolant sight glass and an electronically controlled low coolant display mounted on the instrument panel. An integral surge and deaeration tank shall be provided to optimize the cooling system for all operating conditions.

The cooling system shall be designed to maintain pressure at nine (9) psi for maximum dissipation. A drain valve shall be located at the lowest point of the cooling system and at other points to permit complete flushing of the coolant from the system. Cooling air shall be drawn in by a heavy-duty fan, shrouded by recirculation shields that permit only fresh cool air through the radiator.

Radiator shall be of the serpentine design and bonded together by the patented "beta-weld" process for increased strength, longer road life and solder-bloom corrosion protection. Radiator shall be mounted in a manner to prevent the development of leaks caused by twisting or straining when the apparatus operates over uneven ground. Radiator core shall be compatible with commercial antifreeze solutions. Cooling system shall exhibit rapid warm-up without use of radiator shutters.

FUEL TANK

A 65-gallon fuel tank shall be provided and mounted at rear of chassis. The tank shall be constructed of 12-gauge, hot rolled steel. It shall be equipped with swash partitions and a vent.

A .75" drain plug shall be provided in a low point of the tank for drainage.

A fill inlet shall be located on the driver's side of the body and be covered with a hinged, spring loaded, stainless steel door that is marked "Diesel Fuel Only".

A .50" diameter vent shall be provided running from top of tank to just below fuel fill inlet.

The tank shall meet all FHWA 393.67 requirements including a fill capacity of 95% of tank volume.

All fuel lines shall be provided as recommended by the engine manufacturer.

AUXILIARY FUEL COOLING SYSTEM

A supplementary fuel cooling system shall be provided to allow the use of water from the discharge side of the pump for cooling the chassis engine fuel. The heat exchanger shall be a

cylindrical type and shall be a separate unit. The cooler shall operate any time the pump is discharging water and shall be plumbed to the master drain valve.

The fuel filler cap shall have a retaining chain.

FUEL SHUTOFF
A shutoff valve shall be installed in the fuel line, near the filter.

TRANSMISSION
An Allison, model EVS 3000P, electronic torque converting automatic transmission shall be provided.

Two (2) PTO openings shall be located on left side and top of converter housing (positions 9 o'clock and 3 o'clock).

A transmission temperature gauge with red light and audible alarm shall be installed on the cab dash.

TRANSMISSION, SHIFTER
A five (5)-speed push button shift module shall be mounted to right of driver on console. Shift position indicator shall be indirectly lit for after dark operation.

The transmission ratio shall be: 1st - 3.51 to 1.00, 2nd - 1.91 to 1.00, 3rd - 1.43 to 1.00, 4th - 1.00 to 1.00, 5th - 0.74 to 1.00, R - 4.80 to 1.00.

TRANSMISSION COOLER
A transmission oil cooler shall be provided in the lower tank of the radiator.

TRANSMISSION WARRANTY
The transmission shall have a **five (5) year/Unlimited mileage** warranty covering 100% parts and labor. The warranty to be provided by Allison Transmission and not apparatus builder.

DRIVELINE
Drivelines shall be a heavy duty metal tube and be equipped with Spicer 1710 universal joints.

The shafts shall be dynamically balanced before installation.

A splined slip joint shall be provided in each driveshaft, slip joint shall be coated with Glidecoat or equivalent.

STEERING
Dual Sheppard M110 steering gears, with integral heavy-duty power steering, shall be provided. The power steering shall incorporate a Vickers V20NF hydraulic pump with integral pressure and flow control.

The steering wheel shall be 18.00" in diameter, and capable of tilting and telescoping.

TIRES
Front tires shall be Michelin radials 425/65R22.50, 20 ply "all position" XZY tread. The tires shall be mounted on Alcoa 22.50" x 12.25" polished aluminum disc-type wheels with a ten (10) stud, 11.25" bolt circle.

Rear tires shall be four (4) Michelin radials 12R22.50, 16 ply XDN, ice and snow tread. The outside tires shall be mounted on Alcoa 22.50" x 8.25" polished aluminum disc wheels with a ten (10) stud-11.25" bolt circle.

The inside tires shall be mounted on 22.50" x 8.25" steel disc wheels with a ten (10) stud-11.25" bolt circle.

An isolator shall be provided between the steel and aluminum rims.

LUG NUT COVERS
Chrome plated lug nut covers shall be installed on all lug nuts.

HUB COVERS (front)
Stainless steel hub covers shall be provided on the front axle. An oil level viewing window shall be provided.

HUB COVERS (rear)
A pair of stainless steel high hat hub covers shall be provided on rear axle hubs.

AUTOMATIC TIRE CHAINS
One (1) pair of "On Spot" automatic tire chains shall be provided at the rear. System shall be electric over air operated with switch on cab instrument panel. System to be operable at speeds up to 35 mph.

WHEEL CHOCKS
One (1) pair of folding Ziamatic SAC-44 aluminum alloy Quick-Choc wheel blocks with SQCH-44-H horizontal mounting brackets shall be provided. The chocks should be mounted on the driver side under the rear compartment.

MUD FLAPS
Mud flaps shall be installed behind the front and rear wheels of the apparatus.

CAB
The cab shall be designed specifically for the fire service and manufactured by the chassis builder.

Specifications	Bidder Complies	
	Yes	No

Construction of the cab shall consist of 5052-H32 .125" aluminum welded to extruded aluminum framing.

The cab shall be built by the apparatus manufacturer in a facility located on the manufacturer's premises. (No exceptions)

The cab shall be 96.00" wide, with an interior width of 87.50".

The forward cab section overall height (cab roof to ground) shall be approximately 99.00".

The crew cab section shall have a 16.00” raised roof with an overall cab height of 115.00".

The floor to ceiling height inside the crew cab shall be 68.50.

The crew cab floor shall measure 48.75” from rear wall to the back side of engine tunnel.

The crew cab shall be of the totally enclosed design, with access doors constructed in the same manner as the driver and passenger doors.

The cab shall be a full tilt cab style. The engine shall be easily accessible and capable of being removed with the cab tilted.

Provisions for checking the transmission, oil, and power steering fluid levels shall be placed so that they are accessible without raising the cab.

The cab shall have three (3)-point rubber mounting and shall be tilted by a hydraulic pump connected to two (2) cab lift cylinders. The cab shall then be locked down by a two (2)-point automatic locking mechanism that actuates after the cab has been lowered.

The cab access steps shall be 22.00" wide; crew cab shall be 21.50” wide x 8.00” minimum depth, located inside the door, protecting the step from weather elements.

The inside cab steps shall not exceed 16.50" high.

The crew cab entrance shall be a two (2) step design for easy access.

A 20.00", slip resistant, handrail shall be provided adjacent to all door openings to assist entrance into the cab.

The cab doors shall be 35.00" wide x 69.00" high.

The crew cab doors shall be 34.25" wide x 83.00" high for easy entry, and located on the side of the cab.

Specifications	Bidder Complies	
	Yes	No

The cab and crew cab doors shall be constructed of extruded aluminum with a nominal material thickness of .125". The exterior skins shall be constructed from .090" aluminum.

All cab and crew cab entry doors shall contain a conventional roll down window.

Flush mounted, chrome plated paddle type door handle shall be provided on the exterior of the cab doors.

All interior cab door handles shall also have flush paddle handles.

The door hinge shall be a stainless steel piano type with a .25" pin.

There shall be double automotive type rubber seals around the perimeter of the door framing and door edges to ensure a weather tight fit.

Polished stainless steel scuff plates shall be installed on the inside of all cab doors, extending from the bottom of the door to 9.00" above the floor line.

Cab door panels shall be removable without disconnecting door and window mechanisms.

Engine hood side walls shall be constructed of .50" aluminum, top shall be constructed of .19” aluminum and shall be tapered at top to allow for more driver and passenger elbow room.

The engine hood shall be insulated for protection from heat and sound. The noise insulation keeps the DBA level within the limits stated in the current NFPA series 1900 pamphlet.

Full circular inner fender liners, in the wheel wells, shall be provided.

The outside rear wall of the crew cab shall be covered with a bright aluminum tread plate panel.

A curved, safety glass windshield shall be provided, with over 2,754 square inches of clear viewing area.

The cab windshield shall have bright trim inserts in the rubber molding holding the glass in place.

All cab glass shall be tinted.

Economical windshield replacement glass shall be readily available from local auto glass suppliers.

Two (2) smoked Lexan sun visors, 8.75” x 31.00" long, shall be provided. The sun visors shall be located above the windshield with one (1) mounted on each side of the cab.

Two (2) Electric windshield wipers with washer shall be provided that meet FMVSS and SAE requirements.

The washer reservoir shall be able to be filled without raising the cab.

A certification letter from Dana, stating they approve of the wiper system shall be furnished upon request. The wiper system shall have run through 3,000,000 cycles, and shall achieved certification parameters.

CAB INTEGRITY CERTIFICATION

The fire apparatus manufacturer shall provide a cab crash test certification with this proposal. The certification states that the cab must meet or exceeds the requirements below:

- European Occupant Protection Standard ECE Regulation No.29.

- SAE J2422 Cab Roof Strength Evaluation - Quasi-Static Loading Heavy Trucks.

- SAE J2420 COE Frontal Strength Evaluation - Dynamic Loading Heavy Trucks.

- Roof Crush

The cab shall be subjected to a roof crush force of 26,400 lbs. This value shall be 120% of the ECE 29 criteria, and equivalent to the front axle rating up to a maximum of 10 metric tons.

- Side Impact

The cab shall be subjected to dynamic preload with a 14,060 lb moving barrier is slammed into the side of the cab at 5.1 mph, striking with an impact of 12,200 ft-lbs of energy. This test shall closely represent the forces a cab shall see in a roll-over incident.

- Frontal Impact

The cab shall withstand a frontal force produce from 65,000 ft-lbs of energy using a swing-bob type platen.

There shall be no exception to any portion of the cab integrity certification. Nonconformance shall lead to immediate rejection of bid.

CAB FLOOR

The cab and crew cab floor areas shall be covered with Polydamp™ acoustical floor mat consisting of a black pyramid rubber facing and closed cell foam decoupler.

The top surface of the material has a series of raised pyramid shapes evenly spaced, which offer a superior grip surface. Additionally, the material has a .25" thick closed cell foam (no water absorption) which offers a sound dampening material for reducing sound levels.

CREW CAB WINDOWS
On each side of the crew cab, a window with tinted glass shall be provided.

The rear wall of the crew cab shall have two (2) windows, each being 8.00" wide x 14.00" high.

FENDER CROWNS
Stainless steel fender crowns shall be installed at cab wheel openings. The fender crowns shall have a radius outside corner that allows the fender crown to extend beyond the side wall of the front tires and also allow the crew cab doors to open fully.

SCUFFPLATE
An aluminum four-way scuff plate shall be provided on the rear of engine tunnel, vertical surface. Scuff plate shall be full width and full height.

DOOR JAM SCUFFPLATES
All cab door jambs shall be furnished with a stainless steel scuff plate, mounted on the striker side of the jam.

CONDUIT FOR RADIO INSTALLATION
A section of 1.50" flexible conduit for radio installation shall be provided. The conduit shall be installed from the cab instrument panel to the pump panel microphone and speaker compartment.

MAP BOX
There shall be one (1) map box/es with three (3) bins, open from top. The location required shall be shipped with loose equipment. The map box/es shall be divided into three (3) bins, each being 12.50" wide x 3.00" high x 12.00" deep. Each bin shall slant 30 degrees from horizontal. The map box/es shall be constructed of .125" aluminum and shall be painted to match the cab interior.

CAB LIFT
A hydraulic cab lift system shall be provided consisting of an electric powered hydraulic pump, dual lift cylinders, and necessary hoses and valves.

The hydraulic pump shall have a manual override for backup in the event of electrical failure.

Lift controls shall be located on the front area of the body in a convenient location within an enclosed compartment.

Cab shall be locked down by a two (2)-point automatic spring loaded hook mechanism that actuates after the cab has been lowered.

The hydraulic cylinders shall be equipped with a velocity fuse that protects the cab from accidentally

descending when the control is located in the tilt position.

A redundant mechanical stay arm shall automatically be engaged once the cab has been fully raised. Before lowering the cab, this device must be disengaged using the stay arm control located near the cab raise/lower switch.

INTERLOCK, CAB LIFT TO PARKING BRAKE

The cab lift system shall be interlocked to the parking brake. The cab tilt mechanism shall be active only when the parking brake is set and the ignition switch is in the on position, if the parking brake is released the cab tilt mechanism shall be disabled.

MIRRORS

Velvac, model 2025, low mount chrome mirrors shall be mounted, one (1) on each of the cab door's side. The mirror shall include a replaceable 62.00 sq. Inch flat glass and a 30 sq. Inch convex glass. Overall mirror dimensions shall be 8.50" wide x 13.75" high. Mirror head shall have a highly polished chrome finish.

Both flat mirror heads shall be adjustable by an electric remote control switch inside the cab within easy reach of the driver. Convex mirror heads shall be adjusted manually.

The mirror heads shall also be heated with the control within easy reach of the driver.

Each mirror shall be provided with an LED directional light.

The Velvac **two (2) year** warranty on material and workmanship and **five (5) year** warranty on chrome finish shall be provided.

BUMPER

A one (1) piece, ten (10) gauge, 304-2B type polished stainless steel bumper, a minimum 10.00" high shall be attached to a bolted modular extension frame constructed of 50,000 psi tensile steel "C" channel mounted directly behind it to provide adequate support strength.

The bumper shall be extended 19.00" from front face of cab.

Documentation shall be provided, upon request to show that the options selected have been engineered for fit-up and approval for this modular bumper extension. A chart shall be provided to indicate the option locations and shall include, but not be limited to the following options: air horns, mechanical sirens, speakers, hose trays (with hose capacities), winches, lights, discharge and suction connections.

GRAVEL PAN

A gravel pan, constructed of bright aluminum tread plate, shall be furnished between the bumper and cab face. The gravel pan shall be properly supported from the underside to prevent flexing and vibration of the aluminum tread plate.

TOW EYES

Two (2) chromed steel tow eyes shall be installed under the bumper and attached to the front frame members. The inner and outer edges of the tow eyes shall have a 0.25 radius.

The tow eyes shall be designed and positioned to allow up to a 6,000 pound straight horizontal pull in line with the centerline of the vehicle. The tow eyes shall not be used for lifting of the apparatus.

CAB INTERIOR

The cab instrument panel shall be padded and covered with 46 ounce, leather grain vinyl resistant to oil, grease and mildew.

Door panels shall also be covered with a similar appearing material.

The headliner shall be installed in both forward and rear cab sections. Headliner material shall be vinyl. A sound barrier shall be part of its composition. Material shall be installed on aluminum sheet and securely fastened to interior cab ceiling.

Forward portion of cab headliner shall provide easy access for servicing electrical wiring or for other maintenance needs without removing the entire unit.

CAB INTERIOR UPHOLSTERY

The cab interior upholstery shall be dark silver gray.

INTERIOR PAINT (Cab)

The cab interior metal surfaces shall be painted gray, vinyl texture paint.

CAB SEATING

A Seats Inc. #911 "scissors-action" air-ride high-back style seat shall be provided in the cab for the driver.

The driver's seat shall be furnished with three (3)-point shoulder type seat belt. The seat belt shall be furnished with automatic retractor. Extension shall be provided with the seat belt so the male end can be easily grasped and the female end easily located while sitting in a normal position.

The seat back shall be removable for ease of access to components located behind the driver seat.

SEAT, OFFICER

A Seats Incorporated 911 Concept SCBA Seat shall be provided in the cab for the officer. The SCBA cavity shall be adjustable front to rear in 0.50" increments to accommodate different size SCBA bottles.

Moving the SCBA cavity shall be accomplished by unbolting, relocating and rebolting in the desired location.

The officer seat shall be furnished with three point shoulder type seat belts. The seat belts shall be furnished with automatic retractors. Extensions shall be provided with the seat belts so the male end can be easily grasped and the female end easily located while sitting in a normal position.

RADIO COMPARTMENT

A radio compartment shall be provided under the officer's seat.

The inside compartment dimensions shall be 14.13" deep x 15.75" across x 5.25" high.

A drop-down door with a chrome plated lift and turn latch shall be provided for access.

The compartment shall be constructed of smooth aluminum and painted to match the cab interior.

SEATING (Rear Facing Crew Cab)

Two (2) rear facing Seats Incorporated 911 Concept SCBA Seats shall be provided in the outboard positions in crew cab. The SCBA cavity in each seat shall be adjustable front to rear in 0.50" increments to accommodate different size SCBA bottles.

Moving the SCBA cavity shall be accomplished by unbolting, relocating and rebolting in the desired location.

Seats shall be furnished with three point shoulder type seat belts. The seat belts shall be furnished with automatic retractors. Extensions shall be provided with the seat belts so the male end can be easily grasped and the female end easily located while sitting in a normal position.

SEATING (Forward Facing Crew Cab)

Two (2) forward facing, Seats Incorporated 911 Concept SCBA, seats shall be provided in the center positions, against the cab rear wall. The SCBA cavity in each seat shall be adjustable front to rear in 0.50" increments to accommodate different size SCBA bottles.

Moving the SCBA cavity shall be accomplished by unbolting, relocating and rebolting in the desired location.

Seats shall be furnished with three (3) point shoulder type seat belts. The seat belts shall be furnished with automatic retractors. Extensions shall be provided with the seat belts so the male end can be easily grasped and the female end easily located while sitting in a normal position.

SEAT UPHOLSTERY
All seat upholstery shall be 46 oz. leather grain dark silver gray vinyl resistant to oil, grease and mildew. The backrest bolsters on SCBA type seats and top outside edges of bottom cushion shall be lined with Tuff-Tex material for long lasting durability.

AIR BOTTLE HOLDERS
All SCBA type seats in the cab shall have a Ziamatic, model KD-UH-6-SFCRS SCBA holder with a "knock-down" bracket and collision restraint holding strap mounted in each backrest. The bracket shall be adjustable up and down by simply unbolting, relocating and rebolting in desired position.

SEAT BELTS (red)
All seating positions in cab and crew cab shall have red seat belts.

FOLD UP SEATS
In addition to the stationary crew cab seats two (2) fold up seats with retractable 3 point seat belts shall be provided on the rear wall in the outboard positions.

The seats shall be constructed of a heavy grade vinyl over foam rubber and shall have the bottom covered with brushed stainless steel for a pleasant appearance when the seat is in the up position.

ADVANCED SIDE ROLL PROTECTION PACKAGE
An advanced side roll protection system shall be provided. The system shall be a supplemental restraint system designed for use with seat belts. The system shall be designed for a fast or slow vehicle 90-degree roll to the side, where the vehicle comes to rest on its side. The system shall consist of the following key components:

Side air bags shall only be provided outboard of the driver and officer forward positions. The side air bag shall be a tubular structure that extends diagonally across the width of the side window to help keep the occupant's head inside the vehicle and away from the window opening.

An integral suspension seat safety system shall be installed on the driver's seat. When activated, this system shall remove excess slack from the seat belt and retract the seat to its lowest travel position.

Seat belt pretensioners shall be provided in the remaining seating positions. When activated, these pretensioners shall remove excess slack from the seat belt.

Side wall impact-absorbing cushions shall be provided outboard of the crew cab seating positions.

A Side Roll Sensor shall be installed in the cab above the engine tunnel between the head liner and the cab roof skin. The sensor shall analyze the vehicle's angle and rate of roll to activate the advanced occupant restraints 120ms before the cab reaches 60 degrees from vertical. In the event of a side roll, the sensor shall activate the advanced occupant restraints. The sensor shall not activate in the event of a frontal impact, side impact, or any other incidents not involving a vehicle side rollover. If more than eight protective devices are required, a slave side roll sensor shall be provided with capacity for additional protective devices. The sensor(s) shall perform real time diagnostics of all critical subsystems and shall record sensory inputs immediately before and during a side roll event. A fault-indicating light shall be provided on the vehicles instrument panel.

The apparatus shall have four (4) crew seats in the crew cab.

CAB WARRANTY

The bidder shall furnish a **ten (10) year** cab warranty. The warranty shall cover defects in design or workmanship in the cab tubular support and mounting supports and other cab structural components identified in the specifications. A copy of the warranty shall be submitted with the bid. (No exceptions)

ENGINE COMPARTMENT LIGHT

An engine compartment light shall be installed under the engine hood, of which the switch is an integral part. Light shall have a .125" diameter deep hole in its lens to prevent moisture retention.

CAB INTERIOR LIGHTING

Auxiliary lights shall be provided in the cab and consisting of:

- One (1) Weldon, Model 8081-6978-68, Red/Clear dome light located in the center, controlled by the following:
  Clear forward light controlled by the door switch and the lens switch.
  Red rearward light controlled by the lens switch.

- Two (2) Adjustable Map Lights with switches mounted on the cab ceiling

- A Courtesy Light at Each Door Opening controlled by automatic door switches.

CREW CAB INTERIOR LIGHTING

Auxiliary lights shall be provided in the crew cab and consist of:

- Two (2) Weldon, Model 8081-6978-68, Red/Clear dome lights located one (1) each side, controlled by the following:
  Clear forward light controlled by the door switch and the lens switch.
  Red rearward light controlled by the lens switch.

- A courtesy light at each door opening, controlled by automatic door switches

CAB HEATER

There shall be a 40,000 BTU heater in the cab located below the right side cab dash.

The heater/defroster ventilation shall be built into the design of the cab dash instrument panel.

The heater ducts shall be vented in a manner to provide heat directed towards the officer and the driver.

The defroster ducts shall be designed to provide maximum defrosting capabilities for the front cab windows.

Heater defroster controls shall be located on the cab dash within easy reach of the driver.

CREW CAB HEATER

An auxiliary heater with 50,000 BTU shall be provided inside the crew cab. The heater shall have a three (3) speed blower, and temperature controls located adjacent to the heater.

Heater shall be mounted in seat riser.

AIR CONDITIONING

A high performance air conditioning system shall be furnished inside the cab and crew cab.

The air conditioning system shall perform as follows:

In 100 degree Fahrenheit ambient temperature with 50 percent relative humidity and at maximum compressor speed, the cab and crew cab shall cool down to 75 degrees Fahrenheit within 30 minutes. Actual test results from the manufacturer of the air conditioning system, verifying this performance requirement, shall be submitted with bid.

A 19.0 cubic inch compressor shall be installed on the engine.

A roof mounted condenser, with adequate BTU to meet the performance specification, shall be installed on the cab roof.

Two (2) evaporator units shall be installed in the cab, in the following locations:

- One (1) in the cab dash, just to the front of the officer
- One (1) in the crew cab, mounted to the front of the raised roof, facing rearward

The crew cab evaporator unit shall be mounted to the underside of a storage compartment. The storage compartment shall have a single lift up door.

The evaporator units shall have an adequate BTU rating to meet the performance specifications.

The air conditioning system shall have adjustable air outlets incorporated into the cab dash at both the driver and officer positions. The evaporator unit in the crew cab shall have adjustable air outlets located directly on the evaporator unit.

The air conditioner refrigerant shall be R-134A, installed by a certified technician.

INTERIOR CAB INSULATION

The cab and crew cab walls shall be insulated with 2.00" insulation where possible and the roof with 1.00" insulation to aid in cooling.

The insulation shall be covered with a vinyl liner or a metal panel painted to match the interior.

CAB INSTRUMENTATION

Instrument panel controls and switches shall be identified to function by imprinted word(s) adjacent to each item. Actuation of the headlight switch shall illuminate ("back-lite") wording for after dark operation. Turn signal and high beam headlight indicator lights shall also be provided.

To avoid confusion, warning indicators shall be (where possible) the "dead front" type, meaning the warning light and word identification of the same, does not show up unless it is necessary. The built-in emergency light switch panel shall have a master switch plus individual switches for selective control. The switch panels shall be located in the "overhead" position above the windshield on the driver's/a side to allow for easy access

All non emergency switch panels shall be located in switch housing to the right of the driver, within easy reach.

Switches shall be rocker type containing an indicator light, which is an integral part of the switch. Instrument panel gauges, vehicle lights and other electrical accessories shall have proper size wiring to accommodate the expected current load. Wiring shall meet SAE J-1128 specifications for high temperature (250 degrees Fahrenheit minimum) conditions and shall be color, number and function coded.

Cab instruments and controls shall be conveniently located within the forward cab section. Gauges and emergency vehicle switches shall be installed on removable panels for ease of service. The following gauges and controls shall be furnished:

- Speedometer/Odometer: Electric with trip meter

- Tachometer: Electric

Specifications	Bidder Complies	
	Yes	No

- Hour meter for Engine

- Engine Oil Pressure Gauge: Red warning light and an audible alarm

- Engine Coolant Temperature Gauge: Red warning light and an audible alarm

- Automatic Transmission Oil Temperature Gauge: Red warning light and an audible alarm

- Two (2) Air Pressure Gauges: Red warning lights and an audible alarm

- Voltmeter: Warning light and audible alarm indicating high or low voltage

- Low Coolant Indicator Light (amber): Audible alarm

- Fuel Gauge

- Low Fuel Indicator Light: Audible alarm

- Ignition Switch: Green indicator light

- Starter Control

- Heater Controls

- Headlight Switch

- Self Canceling Turn Signal Switch (arm): Visual indicators

- Headlight Dimmer and Hazard Switch: Incorporated into turn signal arm

- Warning Light Switch Control Panel

- Parking Brake Control: Red indicator light

- Horn Button: Center of the steering wheel (for dual electric horns)

- Control to Check Engine Warning System Indicators.

- High Air Restriction Warning Indicator Light (electronic).

- One two (2)-speed Windshield Wiper Control with Intermittent Feature. The control shall also have a "return to park" provision, which allows the wipers to return to the stored position when the wipers are not in use

- Windshield Washer Controls.

- Ammeter.

- Officer Speedometer, A Class I digital display speedometer shall be provided on the officer side overhead position.

ELECTRICAL POWER CONTROL SYSTEM

Electrical compartments shall be provided in the cab to house the vehicles electrical power and signal circuit protection and control components. The power and signal protection and control compartments shall contain circuit protection devices, power control devices, and vehicle interface modules. Power and signal protection and control components shall be protected against corrosion, excessive heat, excessive vibration, physical damage and water spray. Serviceable components shall be readily accessible.

Circuit protection devices, which conform to SAE standard, shall be utilized to protect each circuit. All circuit protection devices shall be sized to prevent wire and component damage when subjected to extreme current overload. General protection circuit breakers shall be Type-I automatic reset (continuously resetting) or Type-II (manual resetting) and conform to SAE J553 or J258. When required, automotive type fuses conforming to SAE J554, J1284, J1888 or J2077 shall be utilized to protect electronic equipment.

Power control relays and solenoids shall have a direct current (dc) rating of 125 percent of the maximum current for which the circuit is protected.

A programmable logic controller shall be utilized to achieve advanced control of the electrical system. The microprocessor based system shall be extremely reliable, shock proof, vibration resistant and moisture proof. The system shall comply with all appropriate SAE J1939 recommended practices. The compactness of the system shall reduce overall components and wiring size thus the vehicles, weight.

In addition to a visual message center, the logic controller shall activate status indicators and audible alarms designed to provide early warning of problems before they become critical. The programmable logic controller shall include the following attributes:

- On-board self diagnostic messages and status indicators

- Visual LED confirmation of communication at each Vehicle Interface Module and ECU

- Automatic self-test on startup and during vehicle operation

- Eliminate control logic relays wherever possible

- Provide logic control for NFPA 1901 mandated safety interlocks and indicators

- Utilize system integration to eliminate redundant wiring and components

- Improve control system reliability by reducing relay and connector contacts

- Advanced electrical system load management and sequencing system

- Customized control software programmed to reflect the vehicles unique configuration

- Reprogrammable to accommodate changes to the vehicles operating parameters

- Complete operating and troubleshooting manuals

CIRCUIT PROTECTION AND CONTROL DIAGRAM

A diagram of the circuit protection and control system shall be provided inside the circuit protection compartment to allow immediate component identification.

ON-BOARD ELECTRICAL SYSTEM DIAGNOSTICS

Advanced on-board diagnostic messages shall be provided to support rapid troubleshooting of the electrical power and signal system. The diagnostic messages shall be displayed on a LCD message center located at the driver's position. The on-board message center shall include the following diagnostic information:

- Diagnostic codes for engine, transmission, and anti-lock braking system are available via blink code switches and indicator lights

- Simplified warning indicators (from operators perspective

- Multiple diagnostic messages on display with text description

Standard Warning Messages:

- **!!! WARNING !!!** DRIVERS DOOR OPEN
- **!!! WARNING !!!** OFFICERS DOOR OPEN
- **!!! WARNING !!!** REAR DOOR OPEN
- **!!! WARNING !!!** CHECK TRANSMISSION
- **!!! WARNING !!!** STOP ENGINE
- **!!! WARNING !!!** LOW COOLANT LEVEL
- **!!! WARNING !!!** FRONT AIR PSI LOW
- **!!! WARNING !!!** REAR AIR PSI LOW
- **!!! WARNING !!!** HIGH TRANS OIL TEMP
- **!!! WARNING !!!** HIGH ENG WATER TEMP
- **!!! WARNING !!!** MAIN BATT LOW/HIGH
- **!!! WARNING !!!** ENGINE PROTECTION
- **!!! WARNING !!!** LOW ENG OIL PSI
- **!!! WARNING !!!** LOW ENG OIL PSI

Standard Caution Messages

- **!! CAUTION !!** AIR RESTRICTION
- **!! CAUTION !!** CHECK ENGINE
- **!! CAUTION !!** ATC

- !! **CAUTION** !! LOW FUEL LEVEL
- !! **CAUTION** !! WAIT TO START
- !! **CAUTION** !! ABS
- !! **CAUTION** !! LOAD MANAGER ACTIVE

Optional Warning Messages, if so equipped with option
- !!! **WARNING** !!! LADDER RACK DOWN
- !!! **WARNING** !!! AUX BATT LOW/HIGH
- !!! **WARNING** !!! TOWER RAISED

Optional Caution Messages, if so equipped with option
- !! **CAUTION** !! WATER IN FUEL

SERVICE AND MAINTENANCE DIAGNOSTICS

Advanced vehicle service and maintenance shall be assisted with a Windows-based software program. The software shall provide advanced troubleshooting tools to service technicians equipped with an IBM compatible computer. The service and maintenance software shall include the following features:

- Easy to understand and use

- Ability to view system input/output (I/O) information

- Appropriate warnings regarding the location of welding-sensitive components

- A complete troubleshooting guide shall be provided with the vehicle.

VOLTAGE MONITOR SYSTEM

A voltage monitor system shall be provided to indicate the status of the battery system connected to the vehicles electrical load. The monitor system shall provide visual and audio warning when the system voltage is below optimum levels.

The alarm shall activate if the system voltage falls below 11.8 VDC for more than two (2) minutes.

POWER AND GROUND STUDS

Four (4) studs shall be provided in the electrical component compartment for two-way radio equipment. The studs shall consist of a 12-volt battery direct; switched battery, ignition switched power stud and a grounding stud.

EMI/RFI PROTECTION

The electrical system proposed shall reduce undesired electromagnetic and radio frequency emissions. State of the art electrical system design and components shall be used to insure radiated and conducted EMI (electromagnetic interference) and RFI (radio frequency interference) emissions are suppressed at their source.

The apparatus proposed shall have the ability to operate in the electromagnetic environment typically found

in fire ground operations. The contractor shall be able to demonstrate the EMI and RFI testing which has been done on similar apparatus and certifies that the vehicle proposed meets SAE J551 requirements.

EMI/RFI susceptibility shall be controlled by applying appropriate circuit designs and shielding. The electrical system shall be designed for full compatibility with low level control signals and high powered two (2)-way radio communication systems. Harness and cable routing shall be given careful attention to minimize the potential for conducting and radiated EMI-RFI susceptibility. **INTERCOM SYSTEM**

A seven (7) position David Clark, model U3800, intercom system with radio interface at three (3) positions shall be provided.

- Driver position shall have radio interface capability

- Officer position shall have radio interface capability

- Pump operator shall have radio interface capability

- Four (4) crew seats shall have intercom only 2 forward facing seats and 2 rearward facing seats.

The following components shall be supplied with this system.

- One (1)-U3800 Intercom Unit (2 Crew)

- One (1)-U3815 Radio Interface Module (Driver)

- One (1)-U3811 Radio Interface Modules (Officer)

- Two (2)-U3802 Intercom only (2 Crew)

- One (1)-U3815A Radio Interface Module (Pump panel)

- One (1)-H3341 Single Receiver Headset (Driver)

- Five (5)-H3342 Dual Receiver Headset (Officer 4 Crew)

- One (1)-C3023 Belt Station (Pump Panel)

- One (1)-C3820 Power Cable.

- Six (6)-Headset Hangar Hooks

The system shall also be provided with all interconnect cables and radio interface cables.

RADIO INTERFACE CABLE
The body builder shall supply and install the required radio interface cable before delivery of the vehicle. The radio equipment to be used by the customer shall be will be determined at a later date.

RADIO ANTENNA MOUNTS
two (2) antenna mounting bases, model MATM with 17 feet of coax cable and weatherproof cap, shall be provided for 2-way radio or cell phone installation.

One (1) of the mounts shall be located on the cab roof, just to the rear of the officer seat and the additional mount(s) shall be located directly to the left, in the following positions behind the light bar.

The cables shall be routed to the officer side seat box with enough cable for the customer to route it on to the instrument panel if needed.

BATTERY SYSTEM
Four (4)-12 volt, Delphi 700 CCA, 180 reserve capacity, high cycle, maintenance-free, group 31 batteries with a system rating of 2800 CCA at 0 degrees Fahrenheit and 720 minutes of reserve capacity shall be provided. The batteries shall be provided with threaded posts.

BATTERY SYSTEM
A single starting system shall be provided.

An ignition switch and starter button shall be located on the instrument panel.

MASTER BATTERY SWITCH
A master battery switch, to activate the battery system, shall be provided inside the cab within easy reach of the driver.

An indicator light shall be provided on the instrument panel to notify the driver of the status of the battery system.

BATTERY COMPARTMENTS
Batteries shall be placed on non-corrosive mats and be stored in well ventilated compartments located under the cab.

Heavy-duty battery cables shall be used to provide maximum power to the electrical system. Cables shall be color coded.

Battery terminal connections shall be coated with anti-corrosion compound. Battery solenoid terminal connections shall be encapsulated with semi-permanent rubberized compound.

JUMPER STUDS

One (1) set of battery jumper studs with plastic color coded covers shall be installed on the front side of battery box on driver's side. This shall allow enough room for easy jumper cable access. A tag shall be provided for positive/negative terminals.

BATTERY CHARGER

A Kussmaul Autocharge 1000 battery charger with internal battery saver shall be provided. A display bar graph, indicating the state of charge, shall be provided on the driver side seat riser to show if charger is operating.

The battery saver circuit shall be capable of supplying up to three (3) amps for external loads such as handlight or auxiliary radio batteries.

The battery charger shall be wired to the 120-volt shoreline to activate automatically when power is connected.

Battery charger shall be located in the crew cab seat riser.

STAINLESS STEEL BATTERY TRAYS

Stainless steel battery trays shall be provided, for the batteries to sit in.

ALTERNATOR

A Lestek Brute 300, 300 amp alternator shall be provided. A Lestek, Model B300R8, remote regulator and harness shall be provided. It shall have a rated output current of 300 amp as measured by SAE method J56. The alternator shall be connected to the power and ground distribution system with heavy-duty cables sized to carry the full rated alternator output.

CELL PHONE ANTENNA

There shall be one (1) antenna/s installed on the roof. The coax cable shall be run from the antenna to on cab roof over officer seating area behind the light bar.

12 VOLT OUTLETS (other than cab)

There shall be three (3) 12 volt cigarette lighters provided on the apparatus, below the dash area infront of the officer seat.

ELECTRONIC LOAD MANAGER

An electronic load management (ELM) system shall be provided that monitors the vehicles 12-volt electrical system, automatically reduces the electrical load in the event of a low voltage condition, and automatically restores the shed electrical loads when the low voltage condition expires. This ensures the integrity of the electrical system. The ELM shall monitor the vehicle's voltage while at the scene (parking brake applied).

The system shall have the following features:

- System voltage monitoring

- Load manager on/off switch.
- Electrical load shedding.
- Four total load shedding levels.
- Each level is capable of controlling ten relays.
- Load shedding levels are factory preset to maximize efficiency.
- Loads shed at level #1 are the non-NFPA lights in light bar, cab heater/blower, cab a/c evaporator, cab a/c condenser and optional third evaporator.
- Loads shed at level #2 are the crew cab heater and the cab a/c evaporator.
- Loads shed at level #3 are the defrost fans, exhaust fans and additional compartment lights.
- Loads shed at level #4 are driver side scene lights, passenger side scene lights and rear scene lights.

SEQUENCER

An electronic load sequencer shall be provided. It will sequence loads connected to the Electronic Load Manager. The loads shall be turned on one at a time, minimizing the load placed on the alternator at one time.

AMP DRAW REPORT

The bidder shall provide, at the time of bid and delivery, an itemized print out of the expected amp draw of the entire vehicle's electrical system.

The manufacturer of the apparatus shall provide the following:

1) Documentation of the electrical system performance tests.

2) A written load analysis, which shall include the following:
   A) The nameplate rating of the alternator.

   B) The alternator rating under the conditions specified per:
   NFPA 1901,1999 Edition, section 11-3.2.

   C) The minimum continuous load of each component that is specified per:
   NFPA 1901, 1999 Edition, section 11-3.2.

   D) Additional loads that, when added to the minimum continuous load, determine the

total connected load.

E) Each individual intermittent load.

All of the above listed items shall be provided by the bidder per NFPA 1901, 1999 Edition, section 11-15.

EXTERIOR LIGHTING

Exterior lighting shall meet or exceed Federal Department of Transportation, Federal Motor Vehicle Safety Standards and National Fire Protection Association requirements.

Front headlights shall be halogen type, rectangular shaped, quad style mounted in a chrome and polished aluminum housing.

Seven (7) LED clearance and marker lights shall be installed across the leading edge of the cab.

WARNING LIGHTS (Cab Face)

Two (2) pair of Whelen, Model 600 strobe lights shall be installed on the cab face, above the headlights, mounted in a common bezel. Outboard lamps shall be red in color. Inboard lamps shall be clear in color.

The clear cab face strobe lamps shall be capable of being disabled by a switch in the cab. When the parking break is engaged, the clear lamps shall be disabled.

DAYTIME RUNNING LIGHTS (HEADLIGHTS)

The headlights shall include a feature for daytime running lights which shall be automatically activated when the truck is running and parking brake is released. The daytime running light feature shall be deactivated when the primary headlight switch is turned on or when other headlight options are activated.

BACK-UP ALARM

An ECCO, Model SA917-PM2, solid state electronic audible back-up alarm that actuates when the truck is shifted into reverse shall be provided. The device shall sound at 60 pulses per minute and automatically adjust its volume to maintain a minimum five (5) dba above surrounding environmental noise levels.

MANUAL, FIRE APPARATUS PARTS

Two (2) custom parts manuals for the complete fire apparatus shall be provided in hard copy with the completed unit.

One (1) compact disc (CD) shall also be provided that shall include all of the information from the above manual.

Specifications	Bidder Complies	
	Yes	No

The manual shall contain the following:

- Job number
- Part numbers with full descriptions
- Table of contents
- Parts section sorted in functional groups reflecting a major system, component, or assembly
- Parts section sorted in Alphabetical order
- Instructions on how to locate a parts

The manual shall be specifically written for the chassis and body model being purchased. It shall not be a generic manual for a multitude of different chassis and bodies.

SERVICE PARTS INTERNET SITE

The service parts information included in this manual is also available on the factory website. The website offers additional functions and features not contained in this manual, such as digital photographs and line drawings of select items. The website also features electronic search tools to assist in locating parts quickly.

MANUALS, CHASSIS SERVICE

Two (2) chassis service manuals containing parts and service information on major components shall be provided with the completed unit.

The manuals shall contain the following sections:

- Job number
- Table of contents
- Troubleshooting
- Front Axle/Suspension
- Brakes
- Engine
- Tires
- Wheels
- Cab
- Electrical, DC
- Air Systems
- Plumbing
- Appendix

The manual shall be specifically written for the chassis model being purchased. It shall not be a generic manual for a multitude of different chassis and bodies.

MANUALS, CHASSIS OPERATION

Two (2) chassis operation manuals shall be provided.

One (1) compact disk (CD) shall also be provided that shall include all of the information from the above manual.

ELECTRICAL WIRING DIAGRAMS

Two (2) electrical wiring diagrams, prepared for the model of chassis and body, shall be provided.

WATER TANK

Booster tank shall have a capacity of 1000 gallons and be constructed of polypropylene plastic by United Plastic Fabricating, Incorporated.

Tank joints and seams shall be nitrogen welded inside and out.

Tank shall be baffled in accordance with NFPA Bulletin 1901 requirements.

Baffles shall have vent openings at both the top and bottom to permit movement of air and water between compartments.

Longitudinal partitions shall be constructed of .38" polypropylene plastic and shall extend from the bottom of the tank through the top cover to allow for positive welding.

Transverse partitions shall extend from 4.00" off the bottom of the tank to the underside of the top cover.

All partitions shall interlock and shall be welded to the tank bottom and sides.

Tank top shall be constructed of .50" polypropylene. It shall be recessed .38" and shall be welded to the tank sides and the longitudinal partitions.

Tank top shall be sufficiently supported to keep it rigid during fast filling conditions.

Construction shall include 2.00" polypropylene dowels spaced no more than 30.00" apart and welded to the transverse partitions. Two (2) of the dowels shall be drilled and tapped (.50" diameter, 13.00" deep) to accommodate lifting eyes.

A sump that is 8.00" long x 8.00" wide x 6.00" deep shall be provided at the bottom of the water tank.

Sump shall include a drain plug and the tank outlet.

Tank shall be installed in a fabricated cradle assembly constructed of structural steel.

Sufficient crossmembers shall be provided to properly support bottom of tank. Crossmembers

shall be constructed of steel bar channel or rectangular tubing.

Tank shall "float" in cradle to avoid torsional stress caused by chassis frame flexing. Rubber cushions, .50" thick x 3.00" wide, shall be placed on all horizontal surfaces that the tank rests on.

Stops or other provision shall be provided to prevent an empty tank from bouncing excessively while moving vehicle.

Mounting system shall be approved by the tank manufacturer.

Fill tower shall be constructed of .50" polypropylene and shall be a minimum of 8.00" wide x 14.00" long.

Fill tower shall be furnished with a .25" thick polypropylene screen and a hinged cover.

An overflow pipe, constructed of 4.00" schedule 40 polypropylene, shall be installed approximately halfway down the fill tower and extend through the water tank and dump to the rear of the rear axle.

TANK DRAIN

A 3.00" tank drain shall be installed with a 3.00" ball valve located underneath the left front compartment that is properly labeled. Two (2) sleeves shall be provided in the water tank for plumbing to the rear.

WATER TANK WARRANTY

The tank shall have a **lifetime** warranty.

HOSE BED

The hose body shall be fabricated of .125"-5052 aluminum with a 38,000 psi tensile strength.

Hose body width shall be a minimum of 68.00" inside.

Upper and rear edges of side panels shall have a double break for rigidity, a split tube finish shall not be acceptable.

The upper inside area of the beavertails shall be covered with polished stainless steel to prevent damage to painted surface when hose is removed.

Flooring of the hose bed shall be removable aluminum grating with the top surface corrugated to aid in hose aeration. The grating slats shall be a minimum of .50" x 4.50" with spacing between slats for hose ventilation.

Hose bed shall accommodate 800 feet of 5.00" hose, 600 feet of 1.75"ose 1200 feet of 2.50" hose.

Four (4) adjustable hosebed dividers shall be furnished for separating hose.

Each divider shall be constructed of a .125" brushed aluminum sheet fitted and welded into a slotted, radiused extrusion along the top, bottom and rear edge.

Divider shall be held in place by tightening two (2) bolts, one (1) at each end.

Acorn nuts shall be installed on all bolts in the hose bed which have exposed threads.

HOSE BED COVER

The red hose bed cover shall be furnished with shock cord hold downs along the sides of the cover. The rear flap shall have a chain weight and two shock cord hold downs. A Velcro hold down shall be furnished across the front of the hose bed cover.

RUNNING BOARDS

Running boards shall be fabricated of .125" bright aluminum treadplate.

Each running board shall be supported by a welded 2.00" square tubing and channel assembly, which shall be bolted to the pump compartment substructure.

Running boards shall be 12.75" deep and spaced .50" away from the pump panel.

A splash guard shall be provided below the running board treadplate.

TAILBOARD

Rear step shall also be constructed of .125" bright aluminum treadplate and spaced .50" from the body, as well as supported by a structural steel assembly.

The rear tailboard shall be 16.00" deep.

The exterior side shall be flanged down and in.

Flanges shall not be notched.

Entire rear surface between the beavertails shall be covered with bright aluminum treadplate to protect the painted surface when removing hose.

Inside surface of each beavertail in the hose bed area shall be covered with polished stainless steel to protect the paint finish.

The remaining inside surface of the beavertails shall be covered with bright aluminum treadplate.

TOW BAR

A tow bar shall be installed under the tailboard at center of truck.

Tow bar shall be fabricated of 1.00" CRS bar rolled into a 3.00" radius.

Tow bar assembly shall be constructed of .38" structural angle. When force is applied to the bar, it shall be transmitted to the frame rail.

Tow bar assembly shall be designed and positioned to allow up to a 30 degree upward angled pull of 17,000 pounds, or a 20,000 pound straight horizontal pull in line with the centerline of the vehicle.

Tow bar design shall have been fully tested and evaluated using strain gauge testing and finite element analysis techniques.

Grip strut shall be inserted in the driver's side running board. Times New Roman;

Grip strut shall be inserted in the tailboard.

WALKWAY INSERT

Grip-Strut shall be inserted in the top mount walkway .

HOSE TRAY

Two (2) hose trays shall be recessed one in each side running board.

Capacity of the tray shall be 25 feet of 2.5" hose on the driver side and 25 feet of 5/00" hose on the passenger side. Tray must be as shallow as possible.

Rubber matting shall be installed on the floor of the tray to provide proper ventilation.

COMPARTMENTATION

Body and compartments shall be fabricated of .125", 5052-H32 aluminum with a tensile strength range of 31,000 to 38,000 psi.

Side compartments shall be an integral assembly with the rear fenders.

Circular fender liners shall be provided for prevention of rust pockets and ease of maintenance.

Compartment flooring shall be of the sweep out design with the floor higher than the compartment door lip.

The compartment door opening shall be framed by flanging the edges in 1.75” and bending out again .75” to form an angle.

Drip protection shall be provided above the doors by means of bright aluminum extrusion, formed bright aluminum treadplate or polished stainless steel.

The top of the compartment shall be covered with bright aluminum treadplate rolled over the edges on the front, rear and outward side. These covers shall have the corners “TIG” welded.

Side compartment covers shall be separate from the compartment tops.

Front facing compartment walls shall be covered with bright aluminum treadplate.

All screws and bolts which protrude into a compartment shall have acorn nuts on the ends to prevent injury.

UNDERBODY SUPPORT SYSTEM

Due to the severe loading requirements of this pumper a method of body and compartment support suitable for the intended load shall be provided.

The backbone of the support system shall be the chassis frame rails which is the strongest component of the chassis and is designed for sustaining maximum loads.

The support system shall include .375” thick steel vertical angle supports bolted to the chassis frame rails with .625” diameter bolts.

Attached to the bottom of the steel vertical angles shall be horizontal angles, with gussets welded to the vertical members, which extend to the outside edge of the body.

A steel frame shall be mounted on the top of these supports to create a “floating substructure” which shall result in a 500 pound equipment support rating per lower compartment.

The floating substructure shall be separated from the horizontal members with neoprene elastomer isolators. These isolators shall reduce the natural flex stress of the chassis from being transmitted to the body.

Isolators shall have a broad load range, proven viability in vehicular applications, be of a fail safe design and allow for all necessary movement in three (3) transitional and rotational modes.

The neoprene isolators shall be installed in a modified “V” three (3)-point mounting pattern to reduce the natural flex of the chassis being transmitted to the body.

A design with body compartments hanging on the chassis in an unsupported fashion shall not be acceptable.

AGGRESSIVE WALKING SURFACE

All exterior surfaces designated as stepping, standing, and walking areas shall comply with the required average slip resistance of NFPA section 13-7.3.

LOUVERS

All body compartments shall have a minimum of one (1) set of louvers stamped into a wall to provide the proper airflow inside the compartment and to prevent water from dripping into the compartment. These louvers shall be formed into the metal and not added to the compartment as a separate plate.

TESTING OF BODY DESIGN

Body structural analysis shall be fully tested. Proven engineering and test techniques such as finite element analysis, stress coating and strain gauging shall be performed with special attention given to fatigue, life and structural integrity of the cab, body and substructure.

Body shall be tested while loaded to its greatest inservice weight.

The criteria used during the testing procedure shall include:

- Raising opposite corners of the vehicle tires 9.00" to simulate the twisting a truck may experience when driving over a curb.

- Making a 90 degree turn, while driving at 20 mph to simulate aggressive driving conditions.

- Driving the vehicle at 35 mph on a "washboard" road.

- Driving the vehicle at 55 mph on a smooth road.

- Accelerating the vehicle fully, until reaching the approximate speed of 45 mph on rough pavement.

Evidence of actual testing techniques shall be made available upon request.

BODY WARRANTY

A copy of the fire apparatus manufacturer's warranty shall be included with the bid. The warranty shall state that the body shall be free of structural failures caused by defective design or workmanship for a warranty period of **ten (10) years** from the date the new vehicle is first delivered **or 100,000 miles,** whichever occurs first and that defective parts, under the warranty, shall be repaired or replaced without charge to the original purchaser.

COMPARTMENTATION, DRIVER'S SIDE

Specifications	Bidder Complies	
	Yes	No

A full height, vertically hinged, double door compartment ahead of the rear wheels shall be provided. The interior dimensions of this compartment shall be 44.00" wide x 67.63" high x 25.88" deep in the lower 26.00" of the compartment and 12.00" deep in the remaining upper portion. The depth of the compartment shall be calculated with the compartment door closed. The compartment interior shall be fully open from the compartment ceiling to the compartment floor and designed so that no permanent dividers are required between the upper and lower sections. The clear door opening of this compartment shall be 39.50" wide x 63.00" high.

A positive door holder shall be furnished with this compartment.

A horizontally hinged, single lift-up door compartment over the rear wheels shall be provided. The interior dimensions of this compartment shall be 66.50" wide x 32.88" high x 12.00" deep. The depth of the compartment shall be calculated with the compartment door closed. The clear door opening of this compartment shall be 59.50" wide x 28.25" high.

The lift-up door shall be furnished with two gas-charged cylinders to assist in the opening of the door and to maintain the door in an open position. There shall be a field adjustable, three-position bracket mounted on the vertical side door opening that shall allow the door to held open at 87°, 90°, or 93°.

Closing of the door shall not require releasing, unlocking, or unlatching any mechanism.

A full height, vertically hinged, double door compartment behind the rear wheels shall be provided. The interior dimensions of this compartment shall be 47.50" wide x 67.63" high x 12.00" deep. A section of this compartment shall be 25.88" deep x 47.50" wide x 26.00" high directly behind the rear wheels. The depth of the compartment shall be calculated with the compartment door closed. The compartment interior shall be fully open from the compartment ceiling to the compartment floor and designed so that no permanent dividers are required between the upper and lower sections. The clear door opening of this compartment shall be 46.00" wide x 63.00" high.

Positive door holders shall be furnished with this compartment.

COMPARTMENTATION, PASSENGER'S SIDE

A full height, vertically hinged, double door compartment ahead of the rear wheels shall be provided. The interior dimensions of this compartment shall be 44.00" wide x 67.63" high x 25.88" deep in the lower 26.00" of the compartment and 12.00" deep in the remaining upper portion. The depth of the compartment shall be calculated with the compartment door closed. The compartment interior shall be fully open from the compartment ceiling to the compartment floor and designed so that no permanent dividers are required between the upper and lower sections. The clear door opening of this compartment shall be 39.50" wide x 63.00" high.

A positive door holder shall be furnished with this compartment.

A horizontally hinged, single lift-up door compartment over the rear wheels shall be furnished. The interior dimensions of this compartment shall be 66.50" wide x 32.88" high x 12.00" deep. The depth of the compartment shall be calculated with the compartment door closed. The clear door opening of this compartment shall be 59.50" wide x 28.25" high.

The lift-up door shall be furnished with two (2) gas-charged cylinders to assist in the opening of the door and to maintain the door in an open position. There shall be a field adjustable, three-position bracket mounted on the vertical side door opening that shall allow the door to be held open at 87°, 90°, or 93°. Closing of the door shall not require releasing, unlocking, or unlatching any mechanism.

A full height, vertically hinged, double door compartment behind the rear wheels shall be provided. The interior dimensions of this compartment shall be 47.50" wide x 67.63" high x 12.00" deep. A section of this compartment shall be 25.88" deep x 47.50" wide x 26.00" high directly behind the rear wheels. The depth of the compartment shall be calculated with the compartment door closed. The compartment interior shall be fully open from the compartment ceiling to the compartment floor and designed so that no permanent dividers are required between the upper and lower sections. The clear door opening of this compartment shall be 46.00" wide x 63.00" high.

A positive door holder shall be furnished with this compartment.

DOORS, SIDE COMPARTMENT

All hinged compartment doors shall be lap style with double panel construction and shall be a minimum of 1.50" thick. To provide additional door strength, a "C" section reinforcement shall be installed between the outer and interior panels.

Doors shall be provided with a closed cell rubber gasket around the surface that laps onto the body. A second heavy-duty automotive rubber molding with a hollow core shall be installed on the door framing that seals onto the interior panel, to ensure a weather resisting compartment.

All compartment doors shall have polished stainless steel continuous hinge with a pin diameter of .25", that is bolted or screwed on with E-Zinc plated fasteners. (Hinges which are welded on shall not be acceptable.)

All door lock mechanisms shall be fully enclosed within the door panels to prevent fouling of the lock in the event equipment inside shifts into the lock area.

Doors shall be latched with recessed, polished stainless steel "D" ring handles and Eberhard 106 locks.

To prevent corrosion caused by dissimilar metals, compartment door handles shall not be attached to outer door panel with screws. A rubber gasket shall be provided between the "D" ring handle and the door.

COMPARTMENTATION, REAR

A roll-up door compartment above the rear tailboard shall be provided.

Interior dimensions of this compartment shall be 40.00" wide x 54.13" high x 25.88" deep in the lower 45.25" of height and 15.75" deep in the remaining upper portion. Depth of the compartment shall be calculated with the compartment door closed.

A louvered, removable access panel shall be furnished on the back wall of the compartment.

Rear compartment shall be open into the rear side compartments.

Clear door opening of this compartment shall be 33.25" wide x 45.25" high.

Closing of the door shall not require releasing, unlocking, or unlatching any mechanism and shall easily be accomplished with one hand.

ROLL-UP DOOR, REAR COMPARTMENT

The roll-up door shall be of an anodized satin finish, double faced, aluminum construction and manufactured by A&A Manufacturing (Gortite).

Lath sections shall be an interlocking rib design and shall be individually replaceable without complete disassembly of door.

Between each slat at the pivoting joint shall be a PVC inner seal to prevent metal to metal contact and prevent dirt or moisture from entering the compartments. Seals shall allow door to operate in extreme temperatures ranging from plus 180 to minus 40 degrees Fahrenheit. Side, top and bottom seals shall be provided to resist ingress of dirt and weather and be made of Santoprene.

All hinges, barrel clips and end pieces shall be nylon 66. All nylon components shall withstand temperatures from plus 300 to minus 40 degrees Fahrenheit. Hardened plastic shall not be acceptable.

A polished stainless steel lift bar shall be provided for opening door. Lift bar shall be located at the bottom of door and have latches on the outer extrusion of the doors frame. A ledge shall be supplied over lift bar for additional area to aid in closing the door.

Door(s) shall be constructed from an aluminum box section. The exterior surface of each slat shall be flat. The interior surfaces shall be concave to provide strength and prevent loose equipment from jamming the door from inside.

To conserve space in the compartment(s), the spring roller assembly shall not exceed 3.00" in diameter. A roll-up door that retracts below the compartment ceiling (garage door style) shall not acceptable.

The header for the roll-up door assembly shall not exceed 4.00".

A heavy-duty magnetic switch shall be used for control of "open compartment door" warning lights.

All mechanical components of the door shall be warranted to be free from defects in materials and workmanship for the lifetime of the vehicle. All parts covered under this warranty shall be to the original owner.

PULL STRAP, DOORS
Two (2) compartment doors shall be provided with pull straps. lift up doors over the rear wheels both sides of body.

SCUFFPLATE ON INTERIOR OF COMPARTMENT DOOR(S)
Four (4) compartment doors shall include a polished stainless steel scuffplate to cover the entire width and height on the inside panel of each door pan.

Scuffplate shall be located driver side forward compartment doors and officer side forward compartment doors.

SCUFFPLATE, INSIDE DOOR PAN
Four (4) compartment doors shall include a polished stainless steel scuffplate to cover the lower portion of the inside door pan of each door. Each scuffplate shall be 8.00" high and full-width of the compartment door pan.

Scuffplate shall be located on the doors behind the rear wheels on both sides of the body.

PULL-OUT TRAY
There shall be two (2) slide-out trays with 2.00" sides and a minimum capacity of 500 pounds provided. Capacity rating shall be in the extended position.

Slides shall be General Device ball bearing type for ease of operation and years of dependable service.

Automatic locks shall be provided for both the "in" and "out" positions. The trip mechanism for it shall be located at the front of the tray for ease of use with a gloved hand.

Tray location shall be located in the compartments on both sides of the body behind the rear wheels.

Heavy-duty steel angle iron assembly shall support the body under the compartment floor. It shall be attached to the chassis frame for load transfer and to reduce stress on body.

PULL-OUT ADJUSTABLE HEIGHT TRAY

There shall be two (2) slide-out trays with 2.00" sides and a minimum capacity of 250 pounds provided. Capacity rating shall be in the extended position.

Slides shall be equipped with ball bearings for ease of operation and years of dependable service.

Tray location shall be located in the forward body compartments on both sides of body.

Automatic locks shall be provided for both the "in" and "out" positions. The trip mechanism for it shall be located at the front of the tray for ease of use with a gloved hand.

Each tray shall be adjustable up and down within the compartment.

COMPARTMENT GRATING

Vinyl grating shall be provided in fifteen (15) trays or shelves. The locations are, on all shelves, compartment floors and slide out trays.

The vinyl grating shall be .50" thick and be cross bonded by .25" diameter ribbed sections spaced for aeration.

Two (2) partitions shall be bolted in rear tailboard compartment towards the driver side of the compartment. Each partition shall be the full vertical height of the compartment.

PEGBOARD

An aluminum pegboard shall be provided on the rear wall of a compartment.

The pegboard shall be .188" thick with .20" diameter holes punched 1.00" on center in a pegboard pattern.

The pegboard shall be painted to match the compartment interior.

Retainers shall be used to mount the pegboard to the tracks.

A total of four (4) shall be provided and shall be located in the compartment over the rear axle and the compartments behind the rear axle on both sides of body.

VENTILATION SYSTEM

A compartment ventilation system shall be incorporated in up to ten (10) compartments. The system shall consist of a 400 c.f.m. twin fan motor located in the pump house area. PVC

tubing shall be used to force the air into each compartment.

A timer shall allow the system to operate two (2) hours on and four (4) hours off.

ADJUSTABLE SHELVES
There shall be eight (8) shelves, with a minimum capacity of 215 pounds provided. The shelf construction shall consist of .125" pan-shaped aluminum with 2.00" sides. Each shelf shall be infinitely adjustable by means of a threaded fastener, which slides in a track.

The location shall be determined during the drawing review meeting.

MOUNTING TRACKS
There shall be six (6) sets of tracks for mounting shelf(s) in compartments where shelves are located. These tracks shall be installed vertically to support the adjustable shelf(s).

RUB RAIL
Bottom edge of the side compartments shall be trimmed with a bright aluminum extruded rub rail.

Trim shall be 2.12" high with 1.38" flanges turned outward for rigidity.

The rub rails shall not be an integral part of the body construction, which allows replacement in the event of damage.

BODY FENDER CROWNS
Stainless steel fender crowns shall be provided around the rear wheel openings.

A rubber welting shall be provided between the body and the crown to seal the seam and restrict moisture from entering.

A dielectric barrier shall be provided between the fender crown fasteners (screws) and the fender sheet metal to prevent corrosion.

HARD SUCTION HOSE
Two (2) lengths of 3.00" clear corrugated PVC hard suction hose, 10' in length, shall be provided. The hose shall be equipped with a 2.50" NST long handle female coupling on one (1) end and a 2.50" NST rocker lug male coupling on the other end. Couplings shall be hard coated aluminum.

HARD SUCTION HOSE
Two (2) lengths of 6.00" clear corrugated PVC hard suction hose, 10' in length, shall be provided. The hose shall be equipped with a long handle female coupling on one (1) end and a rocker lug male coupling on the other end. Couplings shall be hard coated aluminum.

HARD SUCTION HOSE
One (1) corrugated 5.00" diameter x 6' long smooth bore, clear, flexible PVC hard suction hose shall be provided and preconnected to the front suction. It shall be equipped with a long handle female coupling on one end and a rocker lug male coupling on the other end. Couplings shall be hard coated aluminum.

LOW LEVEL STRAINER
A mounting bracket and a KenMar brand low level strainer shall be installed on the front bumper extension.

HOSE TROUGHS
Hard suction hose shall be carried in two (2) V-shaped troughs, one (1) each side, and held in place by chrome plated, quarter turn, spring loaded clamps.

Troughs shall be constructed of steel and painted job color.

A third and fourth hose trough shall be provided and installed on the driver's side and passenger's side.

HANDRAILS
The handrails shall be 1.25" diameter anodized aluminum extrusion, with a ribbed design, to provide a positive gripping surface.

Chrome plated end stanchions shall support the handrail. Plastic gaskets shall be used between end stanchions and any painted surfaces.

Drain holes shall be provided in the bottom of all vertically mounted handrails.

- One (1) handrail shall be provided on each side of the top mount control panel.

- One (1) vertical handrail, not less than 29.00" long, shall be located on each rear beavertail.

- One (1) full width horizontal handrail shall be provided below the hose bed at the rear of the apparatus.

- Two (2) handrails shall be provided mounted above the driver side and passenger side pump house.

AIR BOTTLE STORAGE (Double)
A total of four (4) air bottle compartments shall be provided. Both side of body in front and behind the rear tires fender panel area. Each air bottle compartment shall be of adequate size to accommodate two (2) air bottles. Flooring shall be rubber lined and be furnished with a drain hole. A stainless steel door with a chrome plated latch shall be provided to contain the air bottles. A dielectric barrier shall be provided between the door hinge, hinge fasteners and

the body sheet metal.

GROUND LADDERS
The following Duo-Safety ladders shall be furnished and must meet or exceed the latest NFPA standards:

- 24', two (2) section, aluminum, Series 900-A

- 14' roof, aluminum, Series 775-A

LADDER STORAGE
The ladders shall be stored between the water tank and the passenger's side compartments.

The ladders shall extend into the pump compartment just to the rear of the water pump discharges.

Each ladder shall be stored vertically in a separate stainless steel storage trough. Each stainless steel trough shall be lined with Dura-Surf nylon slides.

To properly contain the ladders, a bright aluminum treadplate enclosure shall be provided at the rear that shall extend to the rear of the side compartments.

Rear of ladder storage area shall have a vertically hinged bright aluminum treadplate door.

FOLDING LADDER
One (1) 10' aluminum, Series 585-A Duo-Safety folding ladder shall be installed in a U-shaped trough inside the ladder storage compartment.

PIKE POLE, 4'
One (1) pike pole 4' long with a fiberglass "D" handle, shall be provided and located in the pike pole compartment at the rear of the body on the driver side.

PIKE POLE, 6'
One (1) pike pole 6' long with a fiberglass handle shall be provided and located in the ladder compartment.

PIKE POLE,6'
One (1) pike pole 6' long with a fiberglass "D" handle shall be provided and located in the pike pole compartment at the rear of the body on the driver side.

PIKE POLE, 12'
One (1) pike pole, 12' long with a fiberglass handle shall be provided and located in the ladder compartment.

PIKE POLES STORAGE FOR (2)
One (1) pike pole compartment shall be provided, recessed below the water tank tee in the rear of body, on the driver's side. The compartment shall be equipped with two (2) troughs to hold the two (2) pike poles. The door shall be made of aluminum treadplate and shall have a lift and turn latch. The pike pole size shall be 4' and 6' d-handle pike polse.

PIKE POLE STORAGE
Stainless steel U-shaped trough be used for the storage of two (2) pike poles, with D-handle style grip, shall be provided and installed in the pike pole compartment at the rear of the body on the driver side.

PIKE POLE STORAGE
Aluminum tubing shall be used for the storage of two (2) pike poles and shall be located in the ladder compartment at the rear of the body on the right side. If the head of a pike pole can come in contact with a painted surface, a stainless steel scuffplate shall be provided.

STEPS
A step shall be provided on the front of each fender compartment. The front step shall be a bright finished folding type.

REAR FOLDING STEPS
Chrome folding steps shall be provided at the rear. All steps shall provide adequate surface for stepping.

Four (4) additional folding steps shall be located front of the body on the driver and front of the body on the passenger side two additional step each side.

There shall be Two (2) additional folding steps located on the center exterior back wall of crew cab.

PUMP
Pump shall be a Waterous CSUY, 1500 gpm, single stage midship mounted centrifugal type.

Pump shall be the class "A" type.

Pump shall deliver the percentage of rated discharge at pressure indicated below:
- 100% of rated capacity at 150 psi net pump pressure.
- 70% of rated capacity at 200 psi net pump pressure.
- 50% of rated capacity at 250 psi net pump pressure.

Pump body shall be close-grained gray iron, bronze fitted, and must be horizontally split in two (2) sections for easy removal of the entire impeller shaft assembly (including wear rings).

Pump shall be designed for complete servicing from the bottom of the truck, without

disturbing the pump setting or apparatus piping.

Pump case halves shall be bolted together on a single horizontal face, to minimize chance of leakage and facilitate ease of reassembly. No end flanges may be used.

Discharge manifold of the pump shall be cast as an integral part of the pump body assembly, and shall provide a minimum of three (3) 3.50" openings, for flexibility in providing various discharge outlets for maximum efficiency.

The 3.50" openings shall be located as follows: one (1) outlet to the right of the pump, one (1) outlet to the left of the pump, and one (1) outlet directly on top of the discharge manifold.

Impeller shaft shall be stainless steel accurately ground to size, and supported at each end by oil or grease lubricated, anti-friction ball bearings, for rigid precise support. Impeller shall have flame plated hubs assuring maximum pump life and efficiency, despite any presence of abrasive matter in the water supply.

Bearings shall be protected from water and sediment by suitable stuffing boxes, flinger rings, and oil seals. No special or sleeve type bearings shall be used.

Pump shall be equipped with a self-adjusting, maintenance-free, mechanical shaft seal.

The mechanical seal shall consist of a flat, highly polished, spring fed carbon ring that rotates with the impeller shaft. The carbon ring shall press against a highly polished stainless steel stationary ring that is sealed within the pump body.

In addition, a throttling ring shall be pressed into the steel chamber cover, providing a very small clearance around the rotating shaft in the event of a mechanical seal failure. The pump performance shall not deteriorate, nor shall the pump lose prime, while drafting if the seal fails during pump operation.

Wear rings shall be bronze and easily replaceable to restore original pump efficiency and eliminate the need to replace the entire pump casing due to wear.

PUMP TRANSMISSION

Pump transmission shall be made of a three (3) piece, high tensile gray iron, horizontally split casing. Power transfer to pump shall be through a pressure lubricated, Morse HY-VO drive chain.

Drive shafts shall be a minimum of 2.35" diameter hardened and ground alloy steel. All shafts shall be ball bearing supported. The case shall be designed as to eliminate the need for water cooling.

AIR PUMP SHIFT

Pump shift engagement shall be made by a two (2) position sliding collar, actuated pneumatically (by air pressure), with a three (3) position air control switch located in the cab. A manual back-up shift control shall also be located on the driver's side pump panel.

Two (2) indicator lights shall be provided adjacent to the pump shift inside the cab. One (1) green light shall indicate the pump shift has been completed and be labeled "pump engaged". The second green light shall indicate when the pump has been engaged, and that the chassis transmission is in pump gear. This indicator light shall be labeled "OK to pump".

Another green indicator light shall be installed adjacent to the hand throttle on the pump panel and indicate either the pump is engaged and the road transmission is in pump gear, or the road transmission is in neutral and the pump is not engaged. This indicator light shall be labeled "Warning: Do not open throttle unless light is on".

TRANSMISSION LOCK-UP

The direct gear transmission lock-up for the fire pump operation shall engage automatically when the pump shift control, in the cab, is activated.

AUXILIARY COOLING SYSTEM

A supplementary heat exchange cooling system shall be provided to allow the use of water from the discharge side of the pump for cooling the engine water. Heat exchanger shall be cylindrical type and shall be a separate unit. It shall be installed in the pump or engine compartment with the control located on the pump operator's control panel. Exchanger shall be plumbed to the master drain valve. Engine water lines shall be run inside plastic conduit.

INTAKE RELIEF VALVE

An Elkhart relief valve shall be installed on the suction side of the pump preset at 125 psig.

Relief valve shall have a working range of 75 psig to 250 psig.

Outlet shall terminate below the frame rails with a 2.50" National Standard hose thread adapter and shall have a "do not cap" warning tag.

Control shall be located behind an access door at the right (passenger's) side pump panel.

PRESSURE GOVERNOR

A Class1 "Captain" pressure sensing governor (PSG) system shall be provided. The PSG system shall eliminate the need for a discharge pressure relief valve.

The pressure governor system shall be connected directly to the engine mounted Electronic Control Module (ECM) or may be an integral part of the engine ECM. A pressure transducer shall be installed in the water discharge manifold on the pump. The transducer continuously monitors pump pressure sending a signal to the pressure governor. The pressure governor then sends a signal to the engine ECM, which modulates fueling in order to maintain a set

pressure or engine speed (within engine/pump operating capabilities). There shall be no user serviceable items or maintenance required on the PSG system. The PSG system shall not require a mechanical drive, oil, or air supply for a means of control.

The pressure sensor governor system shall be operable only after the vehicle parking brake has been set, the transmission is the pumping mode, and the fire pump has been engaged.

The pressure sensor governor system shall have two (2) modes of operation: pressure mode or rpm mode.

When in the pressure mode, the PSG system shall automatically maintain the discharge pressure set by the operator regardless of flow (within engine/pump operating capabilities).

In the rpm mode, the PSG system shall automatically maintain a set engine speed, regardless of engine load (within engine operation capabilities).

A pump cavitation protection feature shall be provided which shall return the engine to idle should the pump cavitate.

A VHS videotape describing the operation, of the pressure governor, and troubleshooting procedures shall also be provided with the apparatus.

ESP PRIMING PUMP

Priming pump shall be a positive displacement vane type, electrically driven, and conforming to standards outlined in NFPA pamphlet #1901.

One (1) priming control shall open the priming valve and start the priming motor.

Primer shall be environmentally safe and self lubricating.

RECIRCULATING LINE, WITH CHECK VALVE

A .50" diameter recirculating line, from the pump to the water tank, shall be furnished with a control installed at the pump operator's control panel. A check valve shall be provided in this line to prevent the back flow of water from the tank to the pump if the valve is left in the open position.

THERMAL RELIEF VALVE

A thermal protection device shall be included on the pump that monitors pump water temperature and opens to relieve water to cool the pump.

The thermal protection device shall be set to relieve water when the temperature of the pump water exceeds 120o F (49 C).

The thermal protection device shall be include an indicator light and audible buzzer.

The components of the thermal protection device shall be manufactured of brass and stainless steel and be compatible with most foam concentrates.

The thermal protection device shall have 1-1/4 inch NPT threads for easy adaptability to existing pump discharge openings. The discharge line shall be 3/8 inch diameter tubing vented to atmosphere or back to the booster tank.

The thermal protection device shall have a hydrostatic test rating of 600 PSIG (41 BAR).

PUMP WARRANTY

A Waterous **two (2) year** warranty shall be provided for the pump.

PUMP MANUALS

Two (2) pump manuals from the pump manufacturer shall be furnished in compact disc format with the apparatus. Manuals shall cover pump operation, maintenance, and parts.

PUMP TEST

The pump shall be tested, approved and certified by an independent third party testing agency at the manufacturer's expense. The test results along with the pump manufacturer's certification of hydrostatic test, the engine manufacturer's certified brake horse power curve and the manufacturer's record of pump construction details shall be forwarded to the Fire Department.

PLUMBING

All inlet and outlet lines up to 3.00" shall be plumbed with either heavy-duty galvanized threaded pipe or synthetic rubber hose reinforced with hi-tensile polyester braid. Larger inlets and outlets shall be galvanized threaded or welded black iron pipe. If hose is used, it must have a minimum burst rating of 1,000 psi and be equipped with high pressure brass or stainless steel couplings. Any manifold not supplied by the fire pump manufacturer shall be either welded steel plate, cast iron or stainless steel.

Where vibration or chassis flexing may damage or loosen piping or where a coupling is required for servicing, the piping shall be equipped with victaulic or rubber couplings.

All lines to drain through either a master drain valve or shall be equipped with individual drain valves. All individual drain lines for discharges shall be extended with a hose to drain below the chassis frame.

All water carrying gauge lines shall be of flexible polypropylene tubing.

All plumbing used for foam concentrate shall be stainless steel, brass or hose with stainless steel fittings if it cannot be flushed. The plumbing installed for foam solution shall be black iron to prevent "flaking" of the pipe coating. All piping suction and discharge lines 2.50" or

larger, which are used for water only, shall be heavy-duty galvanized pipe. Sweat soldered copper tubing shall not be acceptable.

MAIN PUMP INLETS
A 6.00" pump manifold inlet shall be provided on each side of the vehicle. The suction inlets shall include removable die cast zinc screens that are designed to provide cathodic protection for the pump, thus reducing corrosion in the pump.

BALL INTAKE VALVES
Two (2) TFT AB3 ST-NX 6” NST x 5” storz swivel ball intake valves shall be provided.

SHORT SUCTION TUBE
The suction tubes on the midship pump shall have "short" suction tubes to allow for installation of adapters without excessive overhang.

VALVES
All valves shall be Elkhart Hydro-Loc II series. Seats shall be self-adjusting and constructed of UHMWPE material for operating torque and maximum abrasion resistance. The Elkhart valves shall have an automatic locking feature to hold the ball in any throttle position at any operating pressure. The locking device shall consist of four (4) stainless steel spring loaded cylindrical pins with handle control release cam. Service access to locking mechanism shall be gained by removal of a maximum of two (2) screws.

INLET (Left Side)
On the left side pump panel shall be one (1)-2.50" auxiliary suction terminating in 2.50" National Standard Hose Thread. The auxiliary suction shall be provided with a strainer, chrome swivel and plug. The piping and valve shall be 3.00" for this inlet.

INLET (Right Side)
On the right side pump panel, shall be one (1) - 2.50" auxiliary suction terminating in 2.50" National Standard Hose Thread. The auxiliary suction shall be provided with strainer, chrome swivel and plug. The piping and valve shall be 3.00" for this inlet.

Inlet valve location shall be behind the pump panel.

INLET CONTROL
Gating shall be accomplished at the top-mount control panel by means of a control lever, similar to that used for the discharges.

INLET (Front)
A 5.00" Inlet front inlet with die cast zinc screens shall be provided using 5.00" welded black

iron pipe and a 5.00" butterfly valve. Only radiused elbows shall be used in the piping, no mitered joints.

Drains are furnished in all the low points of piping and have 3/4" valves with air control located on the pump panel.

The front suction shall be located on the passenger side of the bumper extension.

The front suction shall have a chrome plated hand wheel control located at the pump operator's panel for gating the inlet.

INTAKE RELIEF VALVE

An intake relief valve, preset at 125 psig, shall be installed on the inlet side of the valve.

Relief valve shall have a working range of 75 psig to 250 psig.

Outlet shall terminate below the framerails.

The front inlet shall have National Standard hose threads with a long handle chrome plated cap.

The cap shall be the VLH, which incorporates a patent pending thread design to automatically relieve stored pressure in the line when disconnected. (NO EXCEPTIONS)

The front suction shall have a 5.00" swivel with National Standard hose threads and a long handle chromed plated cap.

SWIVEL STOPS

Installed on the front bumper extension shall be stainless steel rods to limit the travel of the front inlet swivel. Two (2) stainless steel rods shall be threaded into the bumper deck.

INLET (Rear)

A 2.50" rear inlet shall be provided with the control located at the operator's panel. A 3.00" ball valve and 3.00" plumbing shall be provided for the inlet.

The inlet shall be located and terminate in the rear tailboard compartment, low and to the driver's side. Keep as short as possible within the compartment as not to interfere with anything else.

The inlet shall be furnished with a National Standard hose thread, chrome plated, swivel and plug.

INLET BLEEDER VALVE

A .75" ball type bleeder valve shall be provided for each side gated inlet. The valves shall be located behind the panel with a handwheel type knob for the control extended to the outside of the panel. The water, that is discharged by the valve, shall be routed below the chassis frame rails.

TANK TO PUMP

The booster tank shall be connected to the intake side of the pump with heavy duty piping and a quarter turn 3.00" full flow line valve with the control remotely located at the operator's panel. A rubber coupling shall be included in this line to prevent damage from vibration or chassis flexing.

A check valve shall be provided in the tank to pump supply line to prevent the possibility of "back filling" the water tank.

TANK REFILL

A 1.50" combination tank refill and pump re-circulation line shall be provided, using a quarter-turn full flow ball valve controlled from the pump operator's panel.

DISCHARGE OUTLETS (Left Side)

There shall be two (2) discharge outlets with a 3.00" valve on the left side of the apparatus, terminating with a male 2.50" National Standard hose thread adapter.

DISCHARGE OUTLET (Right Side)

There shall be two (2) discharge outlets with a 3.00" valve on the right side of the apparatus, terminating with male 2.50" National Standard hose thread adapter.

DISCHARGE OUTLET (Rear)

There shall be one (1) discharge outlet piped to the rear of the hose bed, on driver's side, installed so proper clearance is provided for spanner wrenches or adapters. Plumbing shall consist of 3.00" piping along with a 3.00" full flow ball valve with the control from the pump operator's panel. The one (1) discharge outlet shall terminate with a 2.50" male National Standard hose thread adapter.

DISCHARGE CAPS

Chrome plated, rocker lug, caps with chains shall be furnished for all side discharge outlets.

The caps shall be the VLH, which incorporates a patent pending thread design to automatically relieve stored pressure in the line when disconnected. (NO EXCEPTIONS)

OUTLET BLEEDERS

A .75", quarter turn type, bleeder valve shall be provided for each outlet 1.50" or larger. Automatic drain valves are acceptable with some outlets if deemed appropriate with the application.

The valves shall be located behind the panel with a handwheel type control extended to the outside of the side pump panel. Bleeders shall be located in a horizontal line at the bottom of the pump panel. They shall be properly labeled identifying the discharge they are plumbed in to. The water discharged by the bleeders shall be routed below the chassis frame rails.

ELBOWS, LEFT SIDE OUTLETS

The 2.50" discharge outlets, located on the left side pump panel, shall be furnished with a 2.50"(F) National Standard hose thread x 2.50"(M) National Standard hose thread, chrome plated, 45 degree elbow.

The elbow shall be the VLH, which incorporates a patent pending thread design to automatically relieve stored pressure in the line when disconnected. (NO EXCEPTIONS)

ELBOWS, RIGHT SIDE OUTLETS

The 2.50" discharge outlets, located on the right side pump panel, shall be furnished with a 2.50"(F) National Standard hose thread x 2.50"(M) National Standard hose thread, chrome plated, 45 degree elbow.

The elbow shall be the VLH, which incorporates a patent pending thread design to automatically relieve stored pressure in the line when disconnected.

ELBOWS, REAR OUTLETS

The 2.50" discharge outlets, located at the rear of the apparatus, shall be furnished with a 2.50"(F) National Standard hose thread x 2.50"(M) National Standard hose thread, chrome plated, 45 degree elbow.

The elbow shall be the VLH, which incorporates a patent pending thread design to automatically relieve stored pressure in the line when disconnected. (NO EXCEPTIONS)

DISCHARGE OUTLET CONTROLS

The discharge outlets shall incorporate a quarter-turn ball valve with the control located at the pump operator's panel. The valve operating mechanism shall indicate the position of the valve or an indicator shall be provided to show when the valve is closed.

DELUGE RISER

A 3.00" deluge riser shall be installed above the pump in such a manner that a monitor can be mounted and used effectively. Piping shall be installed securely so no movement develops when the line is charged. The riser shall be gated and controlled at the pump operator's panel.

TELESCOPIC PIPING

The deluge riser piping shall include a 18.00" Task Force Model XG18 Extend-A-Gun extension.

This extension shall be telescopic to allow the deluge gun to be raised 18.00" increasing the

range of operation.

A position sensor shall be provided on the telescopic piping that shall activate the "do not move vehicle" light inside the cab when the monitor is in the raised position.

MONITOR

A Task Force Crossfire Series XFC-42 monitor package shall be properly installed on the deluge riser.

The monitor package shall include a CROSSFIRE monitor with a 10.00" stream shaper and quad stack tips.

A SAFE-TAK portable base unit with two (2) 2.50" inlets shall be provided.

The monitor shall be painted job color.

The deluge riser Extend-a-Gun shall have a provisions for direct mounting a Task Force CrossFire monitor.

SPEEDLAYS

Ahead of the pump enclosure shall be two (2) 1.75" and one (1) 2.5" speedlay hose beds. Two (2) speedlay compartments shall have a 2.00" preconnect line with a 2.00" quarter turn ball valve and terminate with a 1.50" National Standard hose thread 90 degree swivel. One (1) speedlay compartment shall have a 2.5" preconnect with a 2.5" quarter turn ball valve and terminate with a 2.5" National Standard hose thread 90 degree swivel.

Individual controls for the speedlays shall be at the pump operator's panel.

Two (2) compartments shall be capable of carrying 200 feet of 1.75" double jacketed hose. One compartment shall be capable of carrying 200 feet of 2.5" double jacketed hose with the one (1) compartment located above the other.

Scuffplates shall be provided at the sides and bottom of each opening on both sides.

Speedlay flooring shall consist of removable perforated brushed aluminum.

FOAM PROPORTIONER

A foam proportioning system shall be provided that is an on demand, automatic proportioning, single point, direct injection system suitable for all types of Class "A" & "B" foam concentrates, including the high viscosity (6000 cps), alcohol resistant Class B foams. Operation shall be based on direct measurement of water flow, and remain consistent within the specified flows and pressures. The system shall automatically balance and proportion foam solution at rates from 0.1% to 9.9% regardless of variations in water pressure and flow, up to

the maximum rated capacity of the foam concentrate pump.

The design of the system shall allow operation from draft, hydrant, or relay operation. This shall provide a versatile system to meet the demands at a fire scene.

System Capacity

The system shall have the ability to deliver the following minimum foam solution flow rates at accuracys that meet or exceed NFPA requirements at a pump rating of 250 PSI.

160 GPM @ 6%
333 GPM @ 3%
1000 GPM @ 1%

Class A foam setting in .1 % increments from .1% to 1%. Typical settings of 1%, .5% and .3% (Maximum capacity shall be limited to the plumbing and water pump capacity)

Control System

The system shall be equipped with a digital electronic control display located on the pump operators panel. Push button controls shall be integrated into the panel to turn the system on/off, control the foam percentage, direct which foam to use on a multi-tank system, and to set the operation modes (automatic, manual, draft, calibration, or flush).

The percent of injection shall have presets for class A and class B foam. These presets can be changed at the fire department as desired. The percent of injection shall be able to be easily changed at the scene to adjust to changing demands.

In order to minimize the use of abbreviations and interpretations, system information shall be displayed on the panel by way of .50 tall LEDs that total fourteen characters (two lines of 7 each). System on and foam pump on indicator lights shall also be included. Information displayed shall include mode of operation (automatic, manual, draft, calibration, or flush), foam supply selected (Class A or Class B), water total, foam total, foam percentage, remaining gallons, and time remaining.

The control display shall direct a microprocessor, which receives input from the systems water flow meter while also monitoring the position of the foam concentrate pump. The microprocessor shall compare the values of the water flow versus the position/rate of the foam pump, to ensure the proportion rate is accurate. One (1) check valve shall be installed in the plumbing to prevent foam from contaminating the water pump.

Low Level, Foam Tank

The control head shall display a warning message when the foam tank in use is below a quarter tank.

Hydraulic Drive System

The foam concentrate pump shall be powered by a hydraulic drive system, which is automatically activated, whenever the vehicle water pump is engaged. A system that drives the foam pump via an electric motor shall not be acceptable. A large parasitic electric load used to power the foam pump can cause an overload of the chassis electrical system.

Hydraulic oil cooler shall be provided to automatically prevent overheating of the hydraulic oil, which is detrimental to system components. The oil/water cooler shall be designed to allow continuous system operation without allowing hydraulic oil temperature to exceed the oil specifications.

The hydraulic oil reservoir shall be of four (4) gallons minimum capacity and shall also be of sufficient size to minimize foaming and be located to facilitate checking oil level or adding oil without spillage or the need to remove access panels.

Foam Concentrate Pump

The foam concentrate pump shall be of positive displacement, self-priming; linear actuated design, driven by the hydraulic motor. The pump shall be constructed of brass body; chrome plated stainless steel shaft, with a stainless steel piston. In order to increase longevity of the pump, no aluminum shall be present in its construction.

A relief system shall be provided which is designed to protect the drive system components and prevent over pressuring the foam concentrate pump

The foam concentrate pump shall have minimum capacity for 10 gpm with all types of foam concentrates with a viscosity at or below 6000 cps including protein, fluoroprotein, AFFF, FFFP, or AR-AFFF. The system shall deliver only the amount of foam concentrate flow required, without recirculating foam back to the storage tank. Recirculating foam concentrate back to the storage tank can cause agitation and premature foaming of the concentrate, which can result in system failure. The foam concentrate pump shall be self-priming and have the ability to draw foam concentrate from external supplies such as drums or pails.

External Foam Concentrate Connection

An external foam pick-up shall be provided to enable use of a foam agent that is not stored on the vehicle. The external foam pick-up shall be designed to allow continued operation after the on-board foam tank is empty. The external foam pick-up shall be designed to allow use with training foam or colored water for training purposes.

The external foam pick-up shall be one (1) - 1.00" female swivel connection with chrome-plated plug and chain shall be located on the drivers side pump panel. A check valve shall be installed in the external connection. A 1.00" flexible tube with 1.00" male NST thread shall be provided and shipped loose.

Strainer

A strainer with stainless steel screen shall be installed ahead of the foam concentrate pump

inlet port. The strainer shall be easily accessible for cleaning.

Discharges
The foam system shall be plumbed to four discharges. The discharges capable of dispensing foam shall be three speedlays and deluge.

System Electrical Load
The foam proportioning shall not impose an electrical load on the vehicle electrical system any greater than five (5) amps at 12VDC.

Tank Selector
An electric valve shall be used for the foam supply valve. The foam supply valve shall be controlled at the foam system control head for ease of operation. The supply valve shall be electric, remote controlled, to eliminate air pockets in the foam tank supply hose.

Maintenance Message
A message shall be displayed on the control head to advise when system maintenance needs to be performed. The message shall display interval for cleaning the foam strainer, cleaning for the water strainers, and changing the hydraulic oil.

Flush System
The system shall be designed such that a flush mode shall be provided to allow the system to flush all foam concentrate with clear water. The flush circuit control logic shall ensure the foam tank supply valve is closed prior to opening the flush valve. The flush valve shall be operated at the foam system control head for ease of operation. The valve shall be electrically controlled and located as close to the foam tank supply valve as possible. A manual flush drain valve shall be labeled and located under the drivers side running board.

FOAM TANK FILL
A 1.50" fill valve shall be provided at the driver side pump panel to allow filling the foam cell direct from an outside source. The valve shall be outside the panel, and the control for the valve shall be at the valve.

FOAM TANK
The foam tank shall be an integral portion of the polypropylene water tank. The cell shall have a capacity of 50 gallons of foam with the intended use of Class "A" foam. The brand of foam stored in this tank shall be will be determined at a later date. The foam cell shall not reduce the capacity of the water tank. The foam cell shall have a screen in the fill dome and a breather in the lid.

FOAM TANK DRAIN
The foam tank drain shall be a 1.00" drain valve located inside the pump compartment accessible through a door on the passenger's side pump panel.

PUMP COMPARTMENT

The pump compartment shall be separate from the hose body and compartments so that each may flex independently of the other. It shall be a fabricated assembly of steel tubing, angles and channels which support both the fire pump and the side running boards.

Compartment shall be mounted on chassis frame rails with rubber biscuits in a four (4) point pattern to allow for chassis frame twist.

Pump compartment, pump, plumbing and gauge panels shall be removable from the chassis as a single assembly.

PUMP MOUNTING

Pump shall be mounted to a substructure which shall be mounted to the chassis frame rail using rubber isolators. The mounting shall allow chassis frame rails to flex independently without damage to the fire pump.

PUMP CONTROL PANELS (Top Mount)

All pump controls and gauges to be properly marked and located above the pump to the rear of the walkway. Operator to face the rear of the truck when viewing the control panel from the operating position.

The control panel shall be in two planes.

The upper plane shall be hinged at the bottom with a full length stainless steel hinge.

Both planes to be full width of the pump house structure.

The side pump panels shall be 52.00" wide.

The side pump panels shall be removable for ease of maintenance.

Polished stainless steel trim collars to be installed around all inlets and outlets.

Controls shall have chrome plated bezels encircling the opening securely mounted to the pump panel. Identification tags for the discharge controls shall be recessed within the same bezel. The discharge identification tags shall be color coded, with each discharge having its own unique color.

All remaining identification tags shall be mounted on the pump panel in chrome plated bezels.

WALKWAY

A 19.00" wide walkway shall be provided for access to the top control panel. The walkway

shall be constructed of bright aluminum treadplate and properly reinforced.

Bright aluminum treadplate shall be installed below the rear windows of the cab, as a minimum, to protect the paint on the rear of the cab.

WALKWAY TOOL COMPARTMENT
A tool compartment shall be provided on each side of the walkway. Each compartment shall have an aluminum treadplate door and shall be equipped with a compartment light.

PUMP PANEL CONFIGURATION
The pump panel configuration shall be neat and orderly.

PUMP AND GAUGE PANEL
The pump and gauge panels shall be constructed of black vinyl covered aluminum, to allow easy identification of the gauges and controls and to eliminate glare.

The black vinyl shall be bonded to the aluminum, by the company that supplies the product.

A polished aluminum trim molding shall be provided on both sides of the pump panel.

The gauge panel shall be hinged, at the bottom, with a full length stainless steel hinge. The fasteners that hold the panel, in the up right position, shall be quarter-turn style. Vinyl covered chains shall be used to hold the panel in the dropped position.

The driver's and passenger's side pump panels shall be removable and fastened with swell type fasteners.

On the front of the pump house structure, provisions shall be provided for access to the pump.

PUMP PANEL GAUGES AND CONTROLS
The following shall be provided on the pump and gauge panels in a neat and orderly fashion:

- Engine Oil Pressure Gauge: With visual and audible warning

- Engine Water Temperature Gauge: With visual and audible warning

- Tachometer: Electric

- Master Pump Drain Control

- Voltmeter

- Check Transmission Warning Indicator Light

- Stop Engine Warning Indicator Light

- Check Engine Warning Indicator Light.

AIR HORN BUTTON

An air horn control button shall be provided at the pump operator's control panel. This button shall be properly labeled and put within easy reach of the operator.

MASTER GAUGES, VACUUM and PRESSURE

The pump master vacuum and pressure gauge shall be fluid filled NoShok model 40.921. The fluid fill shall be an environmentally friendly synthetic anti-freeze agent, acting as a lubricant and shock absorber.

The gauge accuracy shall comply with ANSI B40.1 Grade A requirements.

Temperature range shall be from -40 degrees F to +160 degrees F.

Gauge construction shall be a heavy duty 304 stainless steel case. Crystal shall be a molded plexiglass with captive O-ring and secured with a rolled 304 highly polished stainless steel bezel.

Gauges shall be a minimum 100mm (4" nom.) in diameter and shall be a compound style gauge with a vacuum/pressure range of 30"- 0 - 600 psi..

Gauges shall have white faces with black markings and shall include an orange tip pointer for easy readability.

The individual pressure gauge shall be installed as close to the outlet control as practical.

The pressure gauges shall come with a **seven (7) year** warranty on accuracy, performance, liquid leakage, discoloration, defects, and workmanship provided by Innovative Controls, Inc.

Test port connections shall be provided at the pump operator's panel. One shall be connected to the intake side of the pump, and the other to the discharge manifold of the pump. They shall have 0.25 in. standard pipe thread connections and polished stainless steel plugs. They shall be marked with a label.

PRESSURE GAUGES

The individual "line" pressure gauges for the discharges shall be fluid filled NoShok model 25.911. The fluid fill shall be an environmentally friendly synthetic anti-freeze agent, acting as a lubricant and shock absorber.

The gauge accuracy shall comply with ANSI B40.1 Grade A requirements.

Temperature range shall be from -40 degrees F to +160 degrees F.

Gauges construction shall be a heavy duty 304 stainless steel case. Crystal shall be a molded plexiglass with captive O-ring and secured with a rolled 304 highly polished stainless steel bezel.

Gauges shall be a minimum 63mm (2.5" nom.) in diameter and shall be a compound style gauge with a vacuum/pressure range of 30"- 0 - 400 psi.

Gauges shall have white faces with black lettering and shall include an orange tip pointer for easy readability.

The individual pressure gauge shall be installed as close to the outlet control as practical.

The pressure gauges shall come with a **seven (7) year** warranty on accuracy, performance, liquid leakage, discoloration, defects, and workmanship provided by Innovative Controls, Inc.

WATER LEVEL GAUGE

An Innovative Controls electric water level indicator shall be provided on the gauge panel. The gauge shall register by means of fourteen high intensity LED lights in a inverted "v" pattern. This level monitor shall indicate the following:

- Full
- 3/4
- 1/2
- 1/4, and
- Refill

The water level indicator shall utilize a chemical resistant PVC probe.

WATER LEVEL GAUGE, CAB SIDES

A water level gauge system shall be provided at Located behind the crew cab door upper area. Each shall be provided with four (4) Whelen, Model 500, LED lights with flanges. The total quantity of the water level gauge systems to be provided shall be two (2).

The lights shall be mounted and indicate the following:

* top light with blue lens - water level full
* next light with green lens - water level 3/4 full
* next light with amber lens - water level 1/2 full
* bottom light with red lens - water level 1/4 full when on solid and shall flash when empty.

The above system shall function similar to the standard five (5) light at the pump panel. The system shall be interlocked to the pump in gear circuit, therefore, allowing the lights to be activated only when the pump is put into gear.

FOAM LEVEL GAUGE

An electric foam level gauge shall be provided on the operator's panel, that registers foam level by means of five (5) brightly colored incandescent lights. The foam level indicators shall be as follows:

- Full = Green
- 3/4 = Yellow
- 1/2 = Yellow
- 1/4 = Yellow
- Refill = Red

To further alert the pump operator, the refill light shall start flashing when the foam level drops below the 1/4 mark.

The level measurement shall be ascertained by sensing the head pressure of the fluid in the tank or cell. This method provides accuracy with an array of multiviscosity foams.

The display shall be constructed of a solid plastic material to reduce vibrations that can cause broken wires and loose electronic components. The encapsulated design shall provide complete protection from water and environmental elements.

The gauge light bulbs shall be rated for 15,000 hours. The bulbs shall be easily replaced by unscrewing the colored lens cover.

The cover plate panel bezel shall be of a chrome plated die cast design. The overlay graphics shall be on the inside surface of the composite overlay to provide protection from wear. The composite overlay shall be scratch resistant and immune to cleaning solvents and UV light weathering.

The foam level probe shall be constructed of chemical resistant PVC plastic with a 3.00" diameter anodized flange. The internal wire connectors and electronics shall be fully encapsulated to protect against water, dirt, and vibration.

LIGHT SHIELDS

Illumination shall be provided at each pump control panel for controls, switches, essential instructions, gauges, and instruments necessary for the operation of the apparatus and the equipment provided on it. External illumination shall be a minimum of five (5) foot-candles on the face of the device. Internal illumination shall be a minimum of four (4) foot-lamberts.

Lights shall be installed under a stainless steel shield. One (1) pump panel light shall come on at the pump operator's panel when the pump is shifted into gear from inside the cab. This shall afford the operator some illumination when first approaching the control panel. The remaining lights shall be actuated from a switch located on the pump panel.

An additional step/light shield shall be provided above driver's side pump panel.

The pump panel shall be illuminated by incandescent lights installed under a bright aluminum treadplate step.

The step shall have a minimum of an 8.00" stepping surface and it shall be properly reinforced to support a man's weight.

The lights shall be operated from a switch on the pump panel.

Each light shall have a .125" hole in the lens to prevent moisture retention.

One (1) Weldon, Model 9186-23882-30, step light shall be provided. The step light shall be installed as to illuminate the top of the step for night time vision. The step light shall be activated by the pump panel light switch.

An additional step/light shield shall be provided above passenger's side pump panel. The pump panel shall be illuminated by incandescent lights installed under a bright aluminum treadplate step.

The step shall have a minimum of an 8.00" stepping surface and it shall be properly reinforced to support a man's weight.

The lights shall be operated from a switch on the pump panel.

Each light shall have a .125" hole in the lens to prevent moisture retention.

One (1) Weldon, Model 9186-23882-30, step light shall be provided. The step light shall be installed as to illuminate the top of the step for night time vision. The step light shall be activated by the pump panel light switch.

MICROPHONE & SPEAKER COMPARTMENT

A microphone and speaker compartment, with a polished stainless steel door, shall be furnished recessed in the upper plane at the pump operator's panel. Compartment size shall be 12.00" high x 9.00" wide x 5.50" deep at the top and 7.50" deep at the bottom.

ELECTRICAL

All 12-volt electrical equipment installed by the apparatus manufacturer shall conform to modern automotive practices. All wiring shall be high temperature type. Wiring shall be run, in loom or conduit, where exposed and have grommets where wire passes through sheet metal. Automatic reset circuit breakers shall be provided which conform to SAE Standards. Wiring shall be color, function and number coded. Function and number codes shall be continuously imprinted on all wiring harness conductors at 2.00" intervals. Exterior exposed wire connectors shall be positive locking, and environmentally sealed to withstand elements

such as temperature extremes, moisture and automotive fluids.

Electrical wiring and equipment shall be installed utilizing the following guidelines:

(1) All holes made in the roof shall be caulked with silicon, rope caulk is not acceptable. Large fender washers, liberally caulked, shall be used when fastening equipment to the underside of the cab roof.

(2) Any electrical component that is installed in an exposed area shall be mounted in a manner that shall not allow moisture to accumulate in it. Exposed area shall be defined as any location outside of the cab or body.

(3) Electrical components designed to be removed for maintenance shall not be fastened with nuts and bolts. Metal screws shall be used in mounting these devices. Also a coil of wire shall be provided behind the appliance to allow them to be pulled away from mounting area for inspection and service work.

(4) Corrosion preventative compound shall be applied to all terminal plugs located outside of the cab or body. All non-waterproof connections shall require this compound in the plug to prevent corrosion and for easy separation (of the plug).

(5) All lights that have their sockets in a weather exposed area shall have corrosion preventative compound added to the socket terminal area.

(6) All electrical terminals in exposed areas shall have silicon (1890) applied completely over the metal portion of the terminal. All emergency light switches shall be mounted on a separate panel installed in the cab. A master warning light switch and individual switches shall be provided to allow pre-selection of emergency lights. The light switches shall be "rocker" type with an internal indicator light to show when switch is energized. All switches shall be properly identified and mounted in a removable panel for ease in servicing. Identification of the switches shall be done by either printing or etching on the switch panel. The switches and identification shall be illuminated.

All lights and reflectors, required to comply with Federal Motor Vehicle Safety Standard #108, shall be furnished. Rear identification lights shall be recessed mounted for protection. Lights and wiring mounted in the rear bulkheads shall be protected from damage by installing a false bulkhead inside the rear compartments.

An operational test shall be conducted to ensure that any equipment that is permanently attached to the electrical system is properly connected and in working order.

The results of the tests shall be recorded and provided to the purchaser at time of delivery.

STEP LIGHTS

Four (4) Weldon, Model 9186-23882-30, step lights shall be provided.

One (1) step light shall be provided on each side, on the front compartment face.

Two (2) step lights at rear, shall illuminate the tailboard.

These step lights shall be actuated with the pump panel light switch.

REAR FMVSS LIGHTING

The rear stop/tail and directional lighting shall consist of the following:

Two (2) Whelen, Model 60R00BRR, red LED stop/tail lights.
Two (2) Whelen, Model 60A00TAR, amber LED populated arrow turn light.

These lights shall be installed at the rear of the truck in a polished housing.

Four (4) red reflectors shall be provided.

A Weldon, Model 23882-2600-00, license plate bracket shall be mounted on the driver's side above the warning lights. A Weldon, Model 9186-23882-30, step lamp shall illuminate the license plate.

Two (2) Peterson, Model M-392, backup lights shall be provided.

The three (3) identification lights located at the rear shall be installed per the following:

As close as practical to the vertical Centerline.
Centers spaced not less than six (6) inches or more than twelve (12) inches apart.
Red in color.
All at the same height.

The outside clearance lights located at the rear shall be installed per the following:

To indicate the overall width of the vehicle.
At least one (1) each side of the vertical Centerline.
All at the same height.
As near the top as practical.
To be visible from the rear and the side.

Per FMVSS 108 and CMVSS 108 requirements.

LIGHTING BEZEL

Two (2) Whelen, Model Cast 3, three (3) light aluminum housings shall be provided for the rear tail, directional and scene lights.

MAP LIGHT

One (1) map light with goose neck with switch control on base of light shall be provided.

Each map light shall be a Sunnex, model 742, with red lens and be located in front of officer seat mounted on dash far right hand corner. Each map light shall be provided with an 20.00" long flexible neck that exits the top of the chassis mount.

"DO NOT MOVE APPARATUS" INDICATOR

A flashing red indicator light (located in the driving compartment) shall be illuminated automatically per NFPA (1996 edition, 9-11 or 1999 edition 11-11). The light shall be labeled "Do Not Move Apparatus If Light Is On".

MESSAGES, DISPLAY, Do Not Move Truck - Enforcer

There shall be the following five (5) warning messages included in this display located on the instrument panel within view of the driver:

Warning Messages:

- D/S Door Open
- P/S Door Open
- Rear Door Open
- Tower Raised
- Ladder Rack Down

These messages shall be displayed only if the options are selected for your truck.

COMPARTMENT LIGHTING

Krystal-lite compartment lights shall be provided in each compartment. One (1) strip shall be mounted vertically along each side of the door framing. There shall be Eight (8) pair pair provided, two (2) in each compartment.

Opening the compartment door, shall automatically turn the compartment lighting on.

PUMP COMPARTMENT LIGHT

A pump compartment light shall be provided inside the right side pump enclosure and accessible through a door on the pump panel.

A .125" weep hole shall be provided in each light lens, preventing moisture retention.

PERIMETER SCENE LIGHTS, CAB

There shall be a Truck-Lite, model 40003, 4.00" grommet mount weatherproof light provided for each cab door. Lighting shall be designed to provide illumination on areas under the driver, officer, and crew cab riding area exits, which shall be activated automatically when the exit doors are opened and by the same means as the body perimeter lights.

The lighting shall be capable of providing illumination at a minimum level of one (1) foot-candle on ground areas within 30.00" of the edge of the apparatus in areas which personnel climb in or out of the apparatus or descend from the apparatus to the ground level.

PERIMETER SCENE LIGHTS, BODY

There shall be a total of four (4) Truck-Lite, model 40003, 4.00" grommet mount weatherproof lights provided on the apparatus. Two (2) lights shall be provided under the rear step area and two (2) lights shall be provided under the pump panel running boards. The lights shall be spaced one (1) each side of apparatus and have a clear lens. The perimeter scene lights shall be activated by a parking brake control and transmission reverse activation.

The lighting shall be capable of providing illumination at a minimum level of one (1) foot-candle on ground areas within 30.00" of the edge of the apparatus in areas designed for personnel to climb onto the apparatus or descend from the apparatus to the ground level.

SIDE SCENE LIGHTS

Two (2) pair of Whelen, Model 60F000*U scene lights shall be installed upper area of cab between the driver door and crew cab door, each side of cab. And one light above the forward body compartment on both sides of truck.

These lights shall have a twenty six degree internal optics to redirect light downward.

The lights shall be controlled by the following:

From the first switch feature, a control from the driver side and the officer side cab and crew cab door openings.

From the second switch feature, a driver side and officer side control at the pump panel.

From the third switch feature, there shall be no control of this option.

From the fourth switch feature, there shall be no control of this option.

These lights shall be installed with 6E or 64 Flange Kit.

DECK LIGHTS

Two (2)-6.00" Unity AG deck lights with swivel mount shall be provided at the rear of the hose bed, one (1) each side.

One (1) light shall be furnished with a 160,000 candle power halogen spot bulb and the other shall be furnished with a 6,000 candle power halogen flood bulb.

HAND HELD SPOTLIGHT

There shall be one (1) spotlight provided. The light shall be an Optronics KB2003 hand held installed in front of officer seating area on the dash. The spotlight shall have a pistol grip, heavy-duty 10 foot coil cord and a push button trigger switch.

HAND HELD LIGHT

There shall be six (6) lights provided, Streamlight LiteBox with the orange thermoplastic body and flood style lamp bulbs. The location shall be two light boxes shall be located each side of crew cab under the fold up seats and one light box shall be mounted below the rear facing

crew cab seats.

AIR HORN SYSTEM
Two (2) Grover shutter tone emergency air horns shall be provided and located, in the front bumper, recessed behind the front bumper. The horn system shall be piped to the air brake system wet tank utilizing .38" tubing. A pressure protection valve shall be installed in-line to prevent the loss of air, in the air brake system.

AIR HORN CONTROL
The air horns shall be actuated by a chrome push button located on the officer side of the engine tunnel and by the horn button in the steering wheel. The driver shall have the option to control the air horns or the chassis horns from the horn button by means of a selector switch located on the instrument panel.

ELECTRONIC SIREN
A "Code 3", model 3692, electronic siren with noise canceling microphone shall be provided.

Siren head shall be located on a swivel bracket mounted on the headliner so that it is accessible to both the driver and officer. The swivel bracket shall be capable of rotating a minimum of 180 degrees.

Siren shall be actuated by a foot switch on the officer's side and by the horn button in the steering wheel. The driver shall have the option to control the siren or the chassis horns from the horn button by means of a selector switch located on the instrument panel.

SPEAKER
There shall be one (1) speaker recessed in the front bumper. Each speaker shall be a Code-3, model PB100C, 100-watt, bumper-mount, with chrome finish. Each speaker shall be connected to the siren amplifier.

WARNING LIGHT (Cab Roof)
A Code 3®, MX, Model 769A1, lightbar shall be mounted on the cab roof.

The length of the lightbar shall be 69.00".

The lightbar shall include the following:
- Nine (9) 50 watt “high speed” rotators.
- Two (2) diamond mirrors.
- Two (2) flat mirrors
- Two (2) intersection lights.

Two (2) switches, one (1) for the colored warning lights and one (1) for all the clear warning lights shall activate the lights in the lightbar.

To meet the NFPA requirements the seven (7) inside rotators, shall be load managed, if colored, or deactivated, if clear, when the parking brake is set. The intersection lights shall be disabled whenever the parking brake is set.

The lightbar shall be provided with clear outer lenses. For lamps that will be colored red, two red half cylinder filters shall be used to totally surround the lamp as opposed to a filter that moves with the lamp (for better heat dissipation).

The following rotating lamps shall have red filters (numbered from officers side to passenger side):
1, 2, 4, 6, 8, 9.

Lamps 3, 5, 7 shall be clear along with the intersection lamps on the lower level of the bar.

Red lamps shall have one switch. Clear lamps shall have another switch. All clear lamps shall be turned off when the parking break is set as noted above.

WARNING LIGHTS (Side)

One (1) pair of flush mounted Whelen, Model: 602000**, linear strobe lights shall be provided.

The lights shall be located, each side of cab behind the rear crew cab doors.

The color of the lights shall be red.

These lights shall be installed with 6E or 64 Flange Kit.

These lights shall be load managed if colored ,or disabled if clear, when the parking brake is set.

LIGHT, TRAFFIC DIRECTING

A Code 3®, Model AS-839, traffic directing light shall be recess mounted at the rear of the vehicle. A standard control head shall be used to actuate the light. This control head shall be located in the cab within easy access to the driver. The control unit shall simulate the lighting sequence on the rear of the vehicle. Whenever the master emergency switch is activated, the traffic directing light shall also be wired to operate in “flash” mode.

The light shall be capable of four (4) warning patterns:
- Arrow Right

- Arrow Left

- Center Out

- Alternating Flash.

SIDE ZONE LOWER LIGHTING

Whelen, Model 602000** linear strobe lights shall be located at the following positions:

Two (2) lights, one each side on the bumper extension – red/clear each front bumper.
Two (2) lights, above the rear tires in the fender panel - red each rear fender.

The above four (4) lights shall be required to meet the lower level optical warning and optical power requirements of NFPA.

The lights shall be controlled by a lighted switch on the cab instrument panel.

There shall be a Whelen, Model UPS-64LX, power supply provided for controlling the flash pattern of the strobe lights.

These lights shall be installed with 6E or 64 Flange Kit.

REAR ZONE LOWER LIGHTING

Two (2) Whelen Model 600 red linear strobe lights shall be located above the rear tail lights at the rear of the apparatus, meeting the lower level optical warning and optical power requirements of NFPA.

Each light shall be installed with 6E or 64 Flange Kit.

WARNING LIGHTS (Rear of Hose Bed)

Two (2) Code 3®, Model 550, rotating beacons shall be provided at the rear of the truck, located one (1) each side. Each beacon shall contain a 50 watt fast rotator. The color of the lights shall be red.

LIGHT, REAR UPPER ZONE, BLOCKING

Two (2) Whelen Model 600 amber linear strobe lights provided at the rear of apparatus at a level of 62.00" or higher.

These strobe lights shall be activated whenever the rear upper zone switch is on and the parking brake is set.

These lights shall be installed with 6E or 64 flange kit.

The rear warning lights shall be mounted on top of the compartmentation with all wiring totally enclosed. The rear deck lights shall be mounted on the beavertails high as possible.

ELECTRICAL SYSTEM GENERAL DESIGN for ALTERNATING CURRENT

The following guidelines shall apply to the 120/240 VAC system installation:

General
Any fixed line voltage power source producing alternating current (ac) line voltage shall produce electric power at 60 cycles plus or minus 5 cycles.

Except where superseded by the requirements of NFPA 1901, all components, equipment and installation procedures shall conform to NFPA 70, National Electrical Code (herein referred to as the NEC).

Line voltage electrical system equipment and materials included on the apparatus shall be listed and installed in accordance with the manufacturer's instructions. All products shall be used only in the manner for which they have been listed.

Grounding
Grounding shall be in accordance with Section 250-6 "Portable and Vehicle Mounted Generators" of the NEC. Ungrounded systems shall not be used. Only stranded or braided copper conductors shall be used for grounding and bonding.

An equipment grounding means shall be provided in accordance with Section 250-91 (Grounding Conductor Material) of the NEC.

The grounded current carrying conductor (neutral) shall be insulated from the equipment grounding conductors and from the equipment enclosures and other grounded parts. The neutral conductor shall be colored white or gray in accordance with Section 200-6 (Means of Identifying Grounding Conductors) of the NEC.

In addition to the bonding required for the low voltage return current, each body and driving or crew compartment enclosure shall be bonded to the vehicle frame by a copper conductor. This conductor shall have a minimum amperage rating of 115 percent of the nameplate current rating of the power source specification label as defined in Section 310-15 (amp capacities) of the NEC. A single conductor, properly sized to meet the low voltage and line voltage requirements shall be permitted to be used.

All power source system mechanical and electrical components shall be sized to support the continuous duty nameplate rating of the power source.

Operation
Instructions that provide the operator with the essential power source operating instructions, including the power-up and power-down sequence, shall be permanently attached to the apparatus at any point where such operations can take place.

Provisions shall be made for quickly and easily placing the power source into operation. The control shall be marked to indicate when it is correctly positioned for power source operation. Any control device used in the drive train shall be equipped with a means to prevent the

unintentional movement of the control device from its set position.

A power source specification label shall be permanently attached to the apparatus near the operator's control station. The label shall provide the operator with the information detailed in Figure 19-4.10.

Direct drive (PTO) and portable generator installations shall comply with Article 445 (Generators) of the NEC.

Overcurrent protection

The conductors used in the power supply assembly between the output terminals of the power source and the main over current protection device shall not exceed 144 inches. (3658 mm) in length.

For fixed power supplies, all conductors in the power supply assembly shall be type THHW, THW, or use stranded conductors enclosed in nonmetallic liquid tight flexible conduit rated for a minimum of 194 degree Fahrenheit (90 degrees Celsius).

For portable power supplies, conductors located between the power source and the line side of the main overcurrent protection device shall be type SO or type SEO with suffix WA flexible cord rated for 600-volts at 194 degrees Fahrenheit (90 degrees Celsius).

Wiring Methods

Fixed wiring systems shall be limited to the following:

- Metallic or nonmetallic liquid tight flexible conduit rated at not less than 194 degrees Fahrenheit (90 degrees Celsius)

or

- Type SO or Type SEO cord with a WA suffix, rated at 600 volts at not less than 194 degrees Fahrenheit (90 degrees Celsius)

Electrical cord or conduit shall not be attached to chassis suspension components, water or fuel lines, air or air brake lines, fire pump piping, hydraulic lines, exhaust system components, or low voltage wiring. In addition the wiring shall be run as follows.

- Separated by a minimum of 12 inches (305 mm), or properly shielded, from exhaust piping

- Separated from fuel lines by a minimum of six (6) inches (152 mm) distance.

Electrical cord or conduit shall be supported within six (6) inches (152 mm) of any junction box and at a minimum of every 24 inches (610 mm) of continuous run. Supports shall be made of nonmetallic materials or corrosion protected metal. All supports shall be of a design that does not cut or abrade the conduit or cable and shall be mechanically fastened to the

vehicle.

Wiring Identification
All line voltage conductors located in the main panel board shall be individually and permanently identified. The identification shall reference the wiring schematic or indicate the final termination point. When prewiring for future power sources or devices, the unterminated ends shall be labeled showing function and wire size.

Wet Locations
All wet location receptacle outlets and inlet devices, including those on hardwired remote power distribution boxes, shall be of the grounding type provided with a wet location cover and installed in accordance with Section 210-7 "Receptacles and Cord Connections" of the NEC.

All receptacles located in a wet location shall be not less than 24 inches (610 mm) from the ground. Receptacles on off-road vehicles shall be a minimum of 30 inches (762 mm) from the ground.

The face of any wet location receptacle shall be installed in a plane from vertical to not more than 45 degrees off vertical. No receptacle shall be installed in a face up position.

Dry Locations
All receptacles located in a dry location shall be of the grounding type. Receptacles shall be not less than 30 inches (762 mm) above the interior floor height.

All receptacles shall be marked with the type of line voltage (120-volts or 240-volts) and the current rating in amps. If the receptacles are direct current, or other than single phase, they shall be so marked.

Listing
All receptacles and electrical inlet devices shall be listed to UL 498, Standard for Safety Attachment Plugs and Receptacles, or other appropriate performance standards. Receptacles used for direct current voltages shall be rated for the appropriate service.

Electrical System Testing
The wiring and associated equipment shall be tested by the apparatus manufacturer or the installer of the line voltage system.

The wiring and permanently connected devices and equipment shall be subjected to a dielectric voltage withstand test of 900-volts for one (1) minute. The test shall be conducted between live parts and the neutral conductor, and between live parts and the vehicle frame with any switches in the circuit(s) closed. This test shall be conducted after all body work has been completed.

Electrical polarity verification shall be made of all permanently wired equipment and receptacles to determine that connections have been properly made.

Operational Test per NFPA 1901 Chapter 19-14.4
The apparatus manufacturer shall perform the following operation test and shall certify that the power source and any devices that are attached to the line voltage electrical system are properly connected and in working order.

The prime mover shall be started from a cold start condition and the line voltage electrical system loaded to 100 percent of the nameplate rating.

The power source shall be operated at 100 percent of its nameplate voltage for a minimum of two (2) hours unless the system meets category certification as defined in NFPA 1901 chapter 19-14.5.

Where the line voltage power is derived from the vehicle's low voltage system, the minimum continuous electrical load as defined in NFPA 1901 Chapter 9 shall be applied to the low voltage electrical system during the operational test.

GENERATOR
The apparatus shall be equipped with a complete electrical power system. The generator shall be a Harrison Model 10.0MAS 10.0 kW Hydraulic unit. The wiring and generator installation shall conform to the present National Electrical Codes Standards of the National Fire Protection Association. The installation shall be designed for continuous operation without overheating and undue stress on components.

Generator Performance

- Continuous Duty Rating: 10,000 watts
- Nominal Volts: 120/240
- Amperage: 83 @ 120 volts, 41 @ 240 volts
- Phase: Single
- Cycles: 60 hertz
- Engine Speed at Engagement: Any (Field Switch)
- RPM range: 900 to 3,000 (hydraulic pump)

Generator Dimensions

- Length: 24.00 inches, 30 inches with reservoir

- Width: 18 inches

- Height: 14.00 inches

- Weight: 273 pounds, 297 with reservoir

The output of the generator shall be controlled by an internal hydraulic system. An electrical instrument gauge panel shall be provided for the operator to monitor and control all electrical operations and output.

The generator shall utilize the main chassis transmission to power the generator. The generator shall be driven by an engine transmission power take off unit, through a hydraulic pump and motor.

The generator shall be operable any time that the truck engine is running and the minimum engine RPM is met. An electrical control, with indicator light, shall be provided inside the cab to activate the generator.

Generator Instruments and Controls

To properly monitor the generator performance a digital meter panel shall be furnished and mounted next to the circuit breaker panel. The meter shall indicate the following items:

- Voltage

- Amperage for both lines

- Frequency

- Generator run hours

- Over current indication

- Over temperature indication

- "Power On" indication

- Two (2) fuse holders with two (2) amp fuses (for indicator light protection)

The meter and indicators shall be installed near eye level in the compartment. Instruments shall be flush mounted in an appropriate sized weatherproof electrical enclosure. All instruments used shall be accurate within +/- two (2) percent.

Generator Wiring:
The system shall be installed by highly qualified electrical technicians to assure the required level of safety and protection to the fire apparatus operators. The wiring, electrical fixtures and components shall be to the highest industry quality standards available on the domestic market. The equipment shall be the type as designed for mobile type installations subject to vibration, moisture and severe continuous usage. The following electrical components shall be the minimum acceptable quality standards for this apparatus:

Wiring:
All electrical wiring shall be fine stranded copper S.O. type. The wire shall be sized to the load and circuit breaker rating; ten (10) gauge on 30 amp circuits, 12 gauge on 20 amp circuits and 14 gauge on 15 amp circuits. The S.O. cable shall be run in corner areas and extruded aluminum pathways built into the body for easy access.

Load Center:
The main load center shall be a Cutler Hammer with circuit breakers rated to load demand.

Circuit Breakers:
Individual breakers shall be provided for all on-line equipment to isolate a tripped breaker from affecting any other on-line equipment.

GENERATOR LOCATION
The generator shall be mounted in the above the pump house. The flooring in this area shall be either reinforced or constructed, in such a manner, that it shall handle the additional weight of the generator.

GENERATOR START
A switch shall be located on the cab instrument panel to engage the generator.

CIRCUIT BREAKER PANEL
The circuit breaker panel shall be located in the driver side forward compartment upper left corner. **120 VOLT LIGHTING**
A Kwik-Raze Model 36 light shall be provided. The light shall be mounted on a special bracket on the front of the cab roof.

The light fixture shall be a single 650 watt, 120 volt, Magnafire 3000 series that draws 5.4 amps. The light shall provide a minimum of 25,200 lumens with a rated bulb life of 400 hours.

Quantity shall be One (1).

Location shall be center on cab just above the windshielf.

120 VOLT LIGHTING

Specifications	Bidder Complies	
	Yes	No

A Kwik-Raze Model 236 Magnafire light shall be provided.

The light shall be top raising with an inner telescoping pole. The telescoping pole shall be as long as is practical to fit in the location it is mounted.

The light shall be installed with side mounting brackets and have a Magnafire 3000 head.

The light fixture shall be a single 650 watt 120 volt MagnaFire 3000 Series head.

The light head shall have a minimum of 25,200 lumens, 5.4 amps.

A total of two (2) lights shall be provided over pump house each side of body.

120 VOLT LIGHTING

A Kwik-Raze Model 1336 light shall be provided. Each light shall have a non-telescopic low clearance permanent mount. The light fixture shall be a single 650 watt, 120 volt, Magnafire 3000 Series unit that draws 4.5 amps.

There shall be two (2) lights provided.

one light each side of body mounted above the rear compartment behind the rear tires.

REMOTE SWITCH (Quartz Light)

A remote on/off actuation switch, with a 12VDC, green indicator light, shall be provided to actuate a 120/240 volt solenoid switch for each quartz light.

The one (1) switch shall be located on the cab instrument panel. The switches shall control the lights on the front of the cab.

FLOOD LIGHT SWITCHES

Remote on/off actuation switches shall be provided in two (2) locations to control two (2) lights. These floodlight switches shall be used to actuate the lights mounted above the rear body compartments. The location of the two (2) switches shall be in the cab on the instrument panel and at both sides at the rear of the apparatus..

ELECTRIC CORD REEL

Furnished with the 120 volt AC electrical system shall be a Hannay, series 1600, cord reel. The reel shall be provided with a 12-volt electric rewind switch, that is guarded to prevent accidental operation and labeled for its intended use. The switch shall be protected with a fuse and installed at a height not to exceed 72 inches above the operators standing position.

A captive roller assembly shall be provided to aid in the payout and loading of the reel. A ball stop shall be provided to prevent the cord from being wound on the reel.

A label shall be provided in a readily visible location adjacent to the reel. The label shall indicate current rating, current type, phase, voltage and total cable length.

A total of one (1) cord reel shall be provided mounted in the rear tail board compartment as high as possible.

The cord reel should be configured with three (3) conductors.

CORD

Provided for electric distribution shall be one (1) length installed on the reel of 200 feet of yellow 10/3 electrical cord, weather resistant 105 degree C to -50 degree C, 600 volt jacketed SOOW cord. No connector shall be provided on the end of the cord.

PORTABLE JUNCTION BOX

There shall be four (4) 120 vac 20 amp twist lock receptacles provided in a portable junction box. The junction box shall be of weatherproof construction and have flip up lids lined with soft neoprene rubber at each outlet opening.

The junction box shall be connected directly to the cord on the reel.

A total of one (1) shall be provided.

20 AMP RECEPTACLE

Wired to the power supply shall be two (2) receptacles that are a 120 volt 20 amp three wire twist-lock NEMA L5-20 type with weather resisting cover located each side of body near the rear wheel well opening.

KUSSMAUL AUTO EJECT FOR SHORELINE

one (1) shoreline receptacle shall be provided to operate the dedicated 120-volt circuits on the truck without the use of the generator.

The shoreline receptacle (s) shall be provided with a 120 volt, 32 amp, 3 pin Kussmaul Super auto eject plug with a gray weatherproof cover. The cover is spring loaded to close, preventing water from entering when the shoreline is not connected.

The unit is completely sealed to prevent road dirt contamination.

A solenoid wired to the vehicle's starter is energized when the engine is started. This instantaneously drives the plug from the receptacle.

An internal switch arrangement shall be provided to disconnect the load prior to ejection to

eliminate arcing of the connector contacts.

The shoreline shall be connected to battery charger and engine block heater.

A mating connector body shall also be supplied with the loose equipment.

The shoreline receptacle shall be located on the driver side rear bulkhead of body.

PAINT

The exterior custom cab and body painting procedure shall consist of a six (6) step finishing process as follows:

1. Manual Surface Preparation - All exposed metal surfaces on the custom cab and body shall be thoroughly cleaned and prepared for painting. Surfaces that shall not be painted include all chrome plated, polished stainless steel, anodized aluminum and bright aluminum treadplate. Each imperfection on the exterior metal surface shall be removed or filled and then sanded smooth for a smooth appearance. All seams shall be sealed before painting.

2. Chemical Cleaning and Treatment - The metal surfaces shall be properly cleaned using a high pressure and high temperature acid etching system. Surfaces are chemically cleaned to remove all dirt, oil, grease and metal oxides to ensure the subsequent coatings bond well. An ultra pure water final rinse shall be applied to all metal surfaces, excluding undercarriage components, at the conclusion of the metal treatment process.

3. Primer/Surfacer Coats - A two (2) component urethane primer/surfacer shall be hand applied to the chemically treated metal surfaces to provide a strong corrosion protective base coat and to smooth out the surface.

4. Hand Sanding - The primer/surfacer coat shall be lightly sanded to an ultra smooth finish.

5. Sealer Primer Coat - A two (2) component sealer primer coat shall be applied over the sanded primer.

6. Topcoat Paint - Two (2) coats of an automotive grade, two (2) component acrylic urethane paint, shall also be applied.

All removable items such as brackets, compartment doors, door hinges, trim, etc. shall be removed and painted separately to insure paint behind all mounted items. Body assemblies that can not be finish painted after assembly shall be finish painted before assembly.

The cab and the body shall be painted Red.

Prior to reassembly and reinstallation of lights, handrails, door hardware and any miscellaneous items an isolation tape, gasket or dielectric material shall be used to prevent

damage to the finish painted surfaces (no exceptions). A nylon washer shall be installed under each acorn nut or metal screw that is fastened directly to an exterior painted surface.

PAINT - ENVIRONMENTAL IMPACT

The contractor shall meet or exceed his current State regulations concerning paint operations. Pollution control shall include measures to protect the atmosphere, water and soil. Controls shall include the following conditions:

- Topcoats and primers shall be chrome and lead free.

- Metal treatment chemicals shall be chrome free. The wastewater generated in the metal treatment process shall be treated on-site to remove any other heavy metals.

- Particulate emission collection from sanding operations shall have a 99.99% efficiency factor.

- Particulate emissions from painting operations shall be collected by a dry filter or water wash process. If the dry filter means is used, it shall have an efficiency rating of 98.00%. Water wash systems shall be 99.97% efficient.

- Water from water wash booths shall be reused. Solids shall be removed mechanically on a continual basis to keep the water clean.

- Paint wastes shall be disposed of in an environmentally safe manner.

- Empty metal paint containers shall be crushed and recycled to recover the metal.

- Solvents used in cleanup operations shall be collected, sent off-site for distillation and returned for reuse. Residue from the distillation operation shall be used as fuel in off-site kilns.

Additionally, the finished apparatus shall not be manufactured with or contain products that have ozone depleting substances. The contractor shall, upon demand, present evidence that his manufacturing facility meets the above conditions and that it is in compliance with his State EPA rules and regulations.

PAINT CHASSIS FRAME ASSEMBLY

The chassis frame assembly shall be painted black before the installation of the cab and body, and before installation of the engine and transmission assembly, air brake lines, electrical wire harnesses, etc. Components that are included with the chassis frame assembly that shall be painted black are frame rails, cross members, axles, suspension, steering gear, fuel tank, body substructure supports, miscellaneous mounting brackets, etc.

WARRANTY - PAINT AND CORROSION

The cab and body exterior paint finish shall be warranted against blistering, peeling, bubbling, lack of adhesion or any other manufacturing or material defect for a period of **six (6) years**.

The cab and body shall also be warranted against corrosion perforation for a period of **ten (10) years**.

A copy of the manufacturer's warranty shall be included with the bid.

PAINT, COMPARTMENT INTERIOR
Interior of all compartmentation shall be painted with a gray spatter type paint.

REFLECTIVE BAND
A 10.00" white reflective band shall be provided across the front of the vehicle and along the sides of the body. A 4.00" band shall be provided at the rear of the apparatus.

JOG(S) IN REFLECTIVE BAND
The reflective band located on each side of the apparatus body shall contain one (1) jog(s) and shall be angled at approximately a 45 degree when installed. The final placement of this reflective band shall be approved by the customer prior to application on the apparatus.

The reflective band provided on the cab face shall be at the headlight level.

MOLDING (on sides of cab)
Chrome molding shall be provided on both sides of cab.

LETTERING
The lettering shall be totally encapsulated between two (2) layers of clear vinyl.

LAMINATION WARRANTY
The manufacturer shall provide a **three (3) year** warranty against defects in material and workmanship with the graphics process. A copy of the fire apparatus manufacturer's warranty shall be included with the bid.

LETTERING
Forty-one (41) to sixty (60) genuine gold leaf lettering, 3.00" high, outlining and shading shall be provided.

GOLD LEAF LETTERING
Forty-eight (48) letters, 8.00" high, shall be provided. Lettering shall be genuine 22 karat gold leaf with an outline for accent. The lettering shall be installed will be determined during drawing review meeting.

EAGLE HOSE NUMBER 3 EMBLEM
A pair of emblems, up to 13.00" in diameter, featuring a flying American flag and an eagle

holding a fire hose, all within a gold leaf circle, shall be installed will be determined during drawing review meeting. The saying, "Over 100 years of dedicated service", shall be within the gold leaf circle. The design shall be color imaged.